CHNOLOGY DEPARTMENT

The
CHEMICAL AGE

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DETROIT

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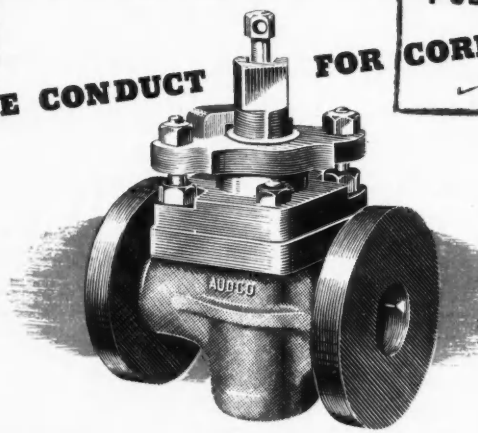

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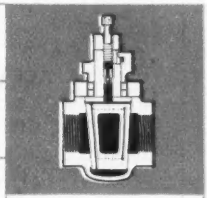

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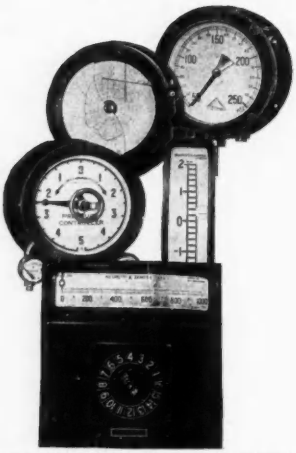

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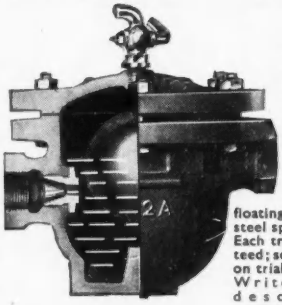

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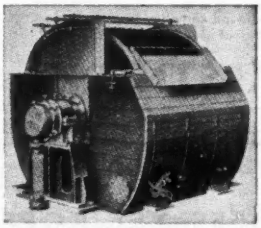

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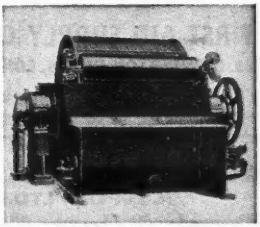

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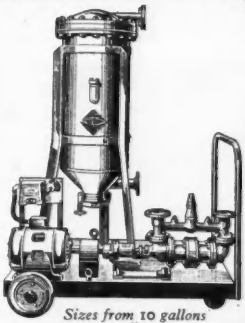

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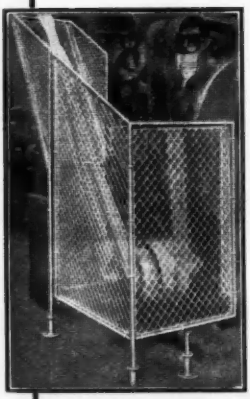

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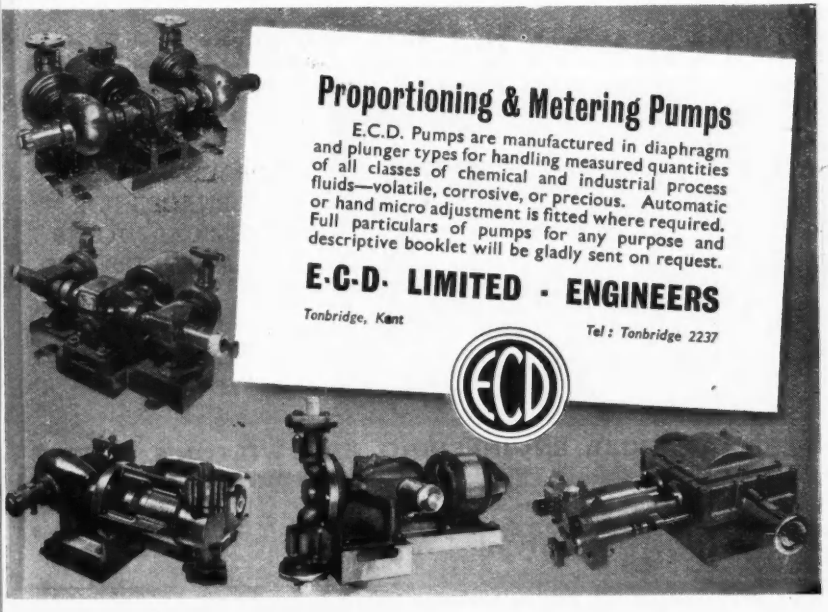
INDEX TO ADVERTISERS
IN THIS ISSUE

	Page
Audley Engineering Co., Ltd.	Front Cover
Auto-Klean Strainers, Ltd.	xix
Badger, E. B., & Sons (Great Britain), Ltd.	x
Balfour, Henry, & Co., Ltd.	xii
Bamag, Ltd.	773
Blackwell's Metallurgical Works, Ltd.	xx
Bowman's Chemicals, Ltd.	xx
Boydell, E., & Co., Ltd.	xx
British Acheson Electrodes, Ltd.	vi
British Tar Products, Ltd.	xvi
Brough, E. A., & Co., Ltd.	xii
Cannon Iron Foundries, Ltd.	ix
Chemical Engineering & Wilton's Patent Furnace Co., Ltd., The	iv
Classified Advertisements	776, xvii, xviii & xix
Cruickshank, R., Ltd.	Cover ii
E.C.D., Ltd.	iii
Electro-Power Service Co., The	xx
Elliott, H. J., Ltd.	x
Evershed & Vignoles, Ltd.	vii
Fielding, T. H., & Sons, Ltd.	xx
First Aid Supply Co., 1925	ii
Fowler, H. G., & Co., Ltd.	Cover ii
Gallenkamp, A., & Co., Ltd.	v
Geigy, Ltd.	775
Girling, S., & Sons (Coopers), Ltd.	ii
Harris, Francis W., & Co., Ltd.	i
Haughton's Metallic Co., Ltd.	775
Hill-Jones, Thomas, Ltd.	v
Imperial Typewriter Co., Ltd.	xv
Jobling, James A., & Co., Ltd.	ix
Kent, James, Ltd.	Cover iii
Kestner Evaporator & Engineering Co., Ltd.	ii, xiv & 775
Key Engineering Co., Ltd., The	Cover ii
Laporte Chemicals, Ltd.	xii
Leigh & Sons Metal Works	xx
Lennox Foundry Co., Ltd.	xx
Metafiltration Co., Ltd., The	i
Metropolitan-Vickers Electrical Co., Ltd.	Cover iv
Negretti & Zambra, Ltd.	Cover ii
Orr, Geo. W., & Co., Ltd.	viii
Paget, Dr. R. F.	xix
Perry & Hope, Ltd.	775
Potter, F. W., & Soar, Ltd.	ii
Reeve Angel, H., & Co., Ltd.	Cover iii
Robinson, Brothers, Ltd.	Cover iii
Shell Chemicals, Ltd.	xv
Simon, Richard, & Sons, Ltd.	x
Spence, Peter, & Sons, Ltd.	iv
Swift & Co., Pty., Ltd.	viii
Timpson, William, Ltd.	xix
Tretol, Ltd.	viii
Unifloc Reagents, Ltd.	
Victoria Instruments	viii
Walker, James, & Co., Ltd.	Cover iv
Wallach Brothers, Ltd.	ii
Wilkinson, James, & Sons, Ltd.	xiv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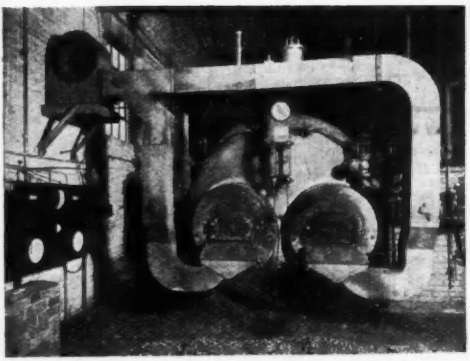

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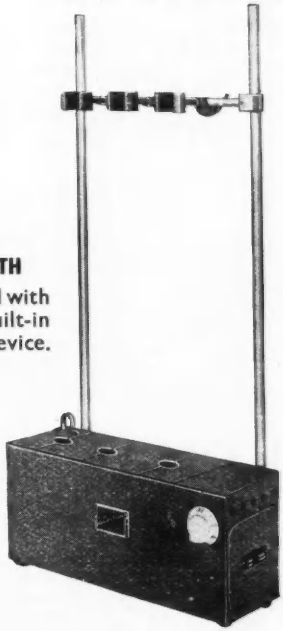

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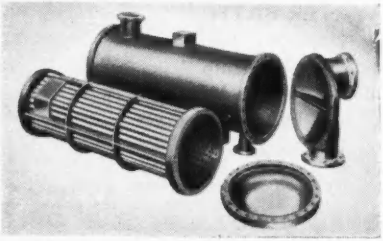

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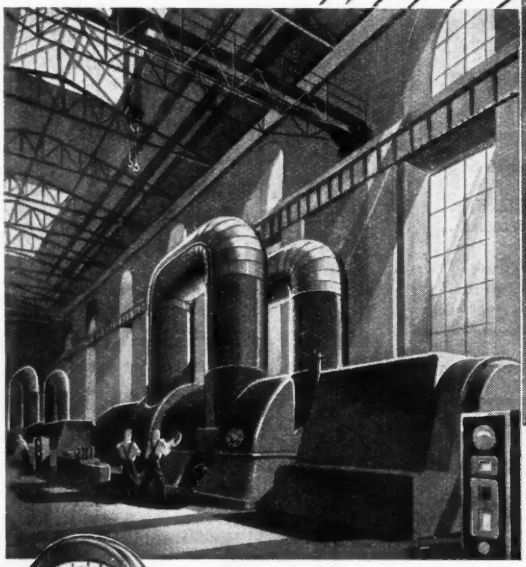

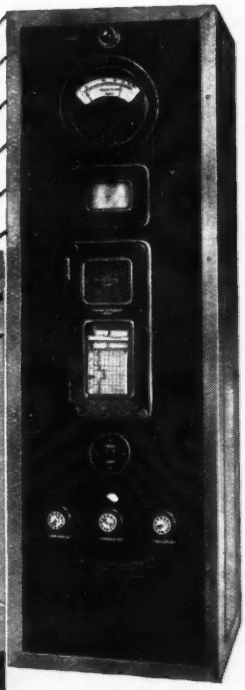

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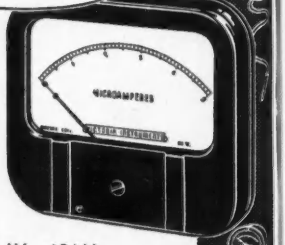

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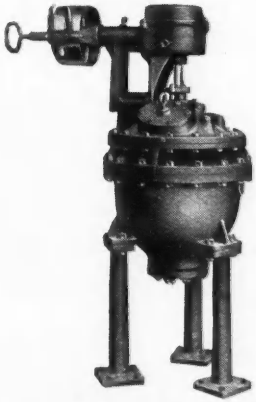

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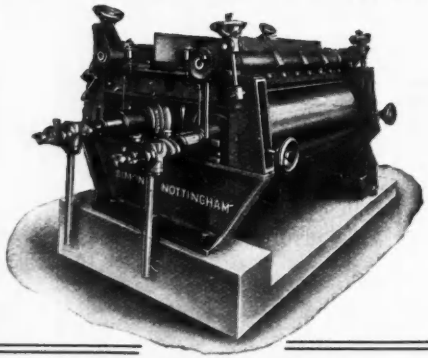

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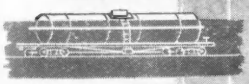

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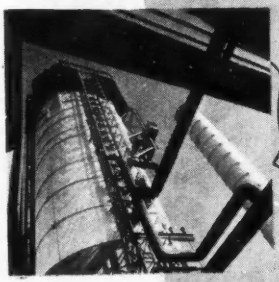

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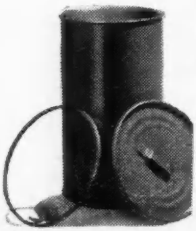

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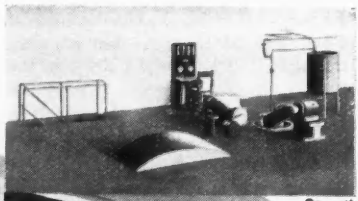

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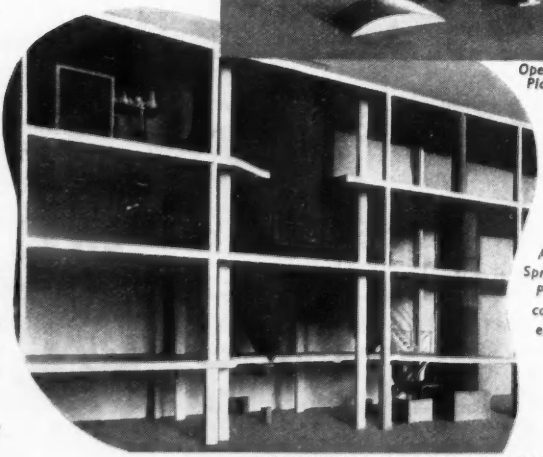

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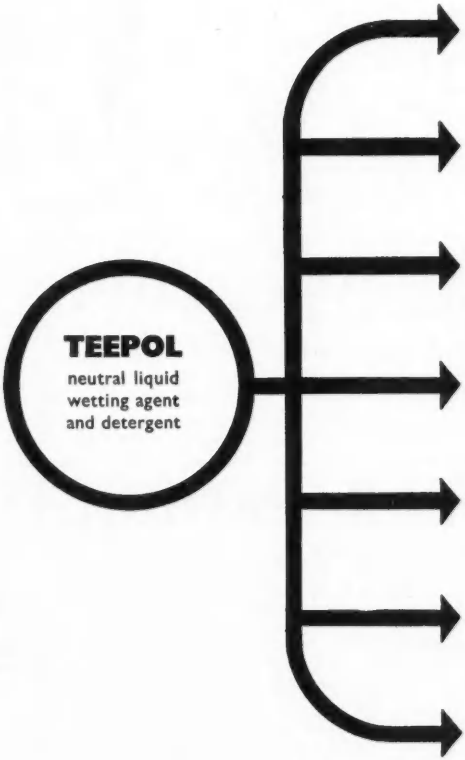

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THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited

VOL. LX
No. 1558

21 May 1949

Annual Subscription 30s.
8d. per copy, post paid, 10d.

Footnote on Nationalisation

A CHARACTERISTIC of all the onslaughts which, since 1946, have been launched on the rights of great industries to run their own affairs has been the one-sidedness of most of the pleadings which have received any widespread public hearing. While few can claim not to have been made fairly fully acquainted with the "unassailable" case for the nationalisation of the coalfields, the majority of people have had to experience the disconcerting results, among others the unparalleled increase in coal costs, with limited output, to appreciate the consequences to which it begins to appear all such reorganisations trend. The absence of any balanced picture in the public mind of what is at stake does not only reflect the effectiveness of the planners' propaganda, it recalls also the characteristic unwillingness of many who are especially well qualified for the task to reveal nationalisation policies in the fuller perspective which only an intimate knowledge of the industries concerned permits. It is conspicuously the case that few of those who have initiated the nationalisation proposals were qualified to form a balanced picture of the industries concerned. That disability, however, will certainly not restrain the ardour of the Labour party spokesmen who are to meet at Whitsun with the confident intention of directing Government policy towards State control of industries, among which cement production is already named and chemicals remains among the favourites, regardless of the Government's discouragement of the project to capture the Imperial Chemical Industries group.

All these portents call urgently for a much wider presentation of informed opinion on current Government policies, founded upon the intimate experience of their effect upon industries in the past and stripped of the purely political bias which has commonly made a true assessment of the facts impossible. Effective leadership in this direction has now been given by Sir Frederick Bain, whose experience in the past two years as the principal negotiator between the Government and industry and as a well placed observer from within of many sections of chemical industry lends weight to what he has to say about the present stage of events. The fact that he was relinquishing his office as president of the Federation of British Industries relieved him of the self-imposed restraints about some of the things which he has viewed with alarm, at close quarters, during an eventful stage of the post-war period.

He says now: "The nationalisation of a great basic industry such as steel, vigorous in its plans for development, efficient in its conduct, alive to the need for scientific research, and enjoying harmonious relations between its management and its workers, is something far transcending

On Other Pages

Leader:
Footnote on Nationalisation ... 741
Notes and Comments:
Self Defence 743
Chemists and Nationalisation ... 743
Unrealistic Metal Prices ... 743
Fire Research 744
Effective Methyl Bromide ... 744
Dutch Chemical Needs 744
Base Metal Prices Cut 745
Radiochemical Centre 745
Radiation Advisory Committee ... 745
Some BIF Results 745
Obsolete Plant and Processes ... 746
Northern-Rhodesian Cobalt 746
Nitrogen from Oil Gas? 746
Sulphuric Acid Production ... 747
Fewer Fatal Accidents 747
Chemical Materials in February ... 748
More Potent Insecticides? 748
Chemical Engineering Research ... 749
Plastics and Polymer Group ... 749
Scottish Wool Research 749
The Nature of Adhesion 750
British Standard Resisting Materials 752
Scientific Approach to Fire Risks ... 753
Declining Use of Coal Products in the U.S.A. 755
Progress in Drugs and Fine Chemicals—VIII 756
British Plant for Ceylon 758
Indian Metals 758
The Chemist's View of Leather ... 759
Improved Soap Manufacture 760
Contemporary Microscopes 761
Instrument Craftsmanship 762
Full Utilisation of Fuel 763
Trapping Carbon Monoxide 764
A Chemist's Bookshelf 765
Royal Society Honours 766
Atomic Research in Australia ... 766
Conserving World Resources ... 768
Research Laboratory Visits 768

party politics, and affects the wellbeing of our whole economic life. Other important industries appear to be similarly threatened. In such circumstances we should be betraying our trust if we failed repeatedly and emphatically to raise our voice in protest. I do not think I am mis-stating their case in saying that those in favour of nationalisation argue in justification that they must have in their own hands in the last resort unfettered control of industries and services which are basic to the economic life of the community.

"In opposition to this theory I would assert that privately owned industry is, in general, fully alive to-day to its national responsibilities, whether economic or social. . . . We challenge those who advocate the nationalisation of industry to come forward with any instance drawn from the events of these post-war years in which privately owned industry has attempted in any way to thwart the achievement of national objectives or has disregarded its national responsibilities.

"It is vital to us to-day to exercise ingenuity, to react flexibly to quickly changing circumstances, to show energy and speed in judgment and action. These are the qualities of private enterprise, not of vast, slow-moving State organisations. . . . Which will be the quicker to respond to the urge to adopt novel expedients to achieve sales, to make those quick decisions by which the winning of orders so often stands or falls, to see and act on the opportunity to develop a new product and to take the risk of its failing; to bend every energy to legitimate forms of cost reduction without which all other efforts will fail . . . Can anyone who is without prejudice, and who understands the issues involved be in any doubt as to the answer?

"Those supporters of nationalisation who feel aggrieved at the high level of current taxation and at the lack of prospect of its reduction, should ponder carefully the extent of the additional burden which the public corporations may, and do throw on the back of the taxpayer. Anything less than maximum efficiency is a cost and a loss to the country, and without disrespect to the efforts of many individuals in the nationalised industries, I have yet to be convinced that from this aspect these organisations are an asset and not a liability."

The foregoing certainly does not overstate the case of those who see in current conditions and portents the building up of a strait jacket system of doubtful efficiency, under which the people who were the architects of past prosperity are being removed from the active list.

NOTES AND COMMENTS

Self Defence

WHAT happens to the chemist when industries fall more and more under the direction of State agencies, or are nationalised outright? And what happens to the industries themselves and all the ability and values which they brought into being? Those are the kind of questions which are being asked with a more insistent note in several quarters. The National Union of Manufacturers has forcefully raised the second problem in a manifesto this week, and the prospects of safeguarding chemists are being seen as a matter no less urgent by the British Association of Chemists, whose Nottinghamshire and Derby section is calling a meeting " open to all chemists " in Derby on May 31 to ascertain what those most intimately concerned are prepared to do about it. Rather tardily, it is now being admitted that in current conditions, in which most of the rewards are won by organised group representation at the expense of individuals, the position of independent chemists is not so secure amid changing domestic policies as that of the average paid-up member of, for example, the Municipal and General Workers' Union. In the eyes of some chemists, trades unionism is repugnant and inappropriate. Circumstances of their employment and prudence have been causing some others to join the trade union group nearest to hand where they conspicuously do not belong.

Chemists and Nationalisation

THE embattled arguments for a widely representative and authoritative union of chemists, which have been presented only partially and intermittently since 1934, are likely to be stated with new force at Derby, where chemists are to be invited to consider " Nationalisation as it affects the chemist " and its corrollary, the prospect of achieving affiliation between the Royal Institute of Chemistry and the BAC. The deeply rooted objections to such an association have not evaporated, but in the light of the new circumstances a strong case can now be presented for a fresh hearing of the proposals, towards which the attitude of the RIC is believed to be considerably more cordial than it was. Two factors seem to be beyond the realm of controversy: Neither the RIC or the BAC alone can speak authoritatively for chemists as a whole; meanwhile some chemists are being gathered into engineering unions and equally remote groups where their professional interests are not likely to be improved.

Unrealistic Metal Prices

THE satisfaction that has been expressed this week with the news that official prices here of three of the widely used non-ferrous metals, electrolytic copper, lead and zinc, have been obliged to align themselves to some extent with the new lower levels of world values, led by the decisive cuts in the U.S.A., is founded on more than the financial relief afforded by the rebates of from £10 to £16 per ton. They were greatly needed to help in removing the grounds for the reiterated complaint that British manufactured goods are too costly, but they leave the British metal prices still on a lonely eminence. American copper, for example, is being quoted at the equivalent of £100 per long ton against the new " cut " price here of £130. Delivery charges alone do not account for more than a very small proportion of that discrepancy. More solid grounds for celebration are seen in the implied admission that artificial price structures cannot be maintained indefinitely, even by a British Government authority, and the new evidence for a fact that has long been conspicuous: that a much more flexible trading machinery is needed now than anything the Ministry of Supply can provide. Such arguments as there are for the continued exclusion of the London Metal Exchange have now become very tattered in the gale of criticism generated by unfavourable comparisons between base metal trading conditions here and overseas. There is very little satisfaction, for example, in the corrolary provided this week in the report of the Auditor General, Sir F. N. Tribe, that the Supply Ministry netted a profit of over £6 million on its dealings in non-ferrous metals in 1947-48; and even less in the reflection that all this may possibly be forfeited in satisfying the Ministry's " forward commitments . . . to safeguard sterling supplies."

Fire Research

CHEMICAL industry, sharing with the oil industry the forefront in the engagement in which fire is the enemy, has better reason than most to applaud the joint enterprise of the Department of Scientific and Industrial Research and the Fire Offices' Committee in carrying on most actively the scientific attack on the sources of fire damage. This very useful collaboration in the field in which pure and applied chemistry have traditionally been the chief figures is a beneficial legacy of the war, when the two industrial organisations shared the vital task of finding means of reducing the havoc of the fire bomb raids. Evidence of the undiminished vigour with which the data on "unpremeditated exothermic reactions" are being sought is to be found in "Fire Research, 1947," issued by the DSIR, which should find a place in the library of any works safety organisation. The sections dealing with the burning of liquids and the use of foam and other chemical extinguishers on burning fuel oil appear to provide especially useful references embodying the results of well observed tests with burning fuel tanks at Llandarcy.

Effective Methyl Bromide

POSSIBLY the most useful data produced, confirming industrial and some other experience, concerns the marked superiority as fire suppressors of methyl bromide and, in a slightly smaller degree, of carbon tetrachloride, operating in the vapour phase. The problem of choice from the practical standpoint of industry is a little complicated by the varying effectiveness of all such extinguishers, according to the combustible material. The need to adapt the extinguisher or inhibitor to the material in which the fire risk resides is conspicuous. There are, of course, situations in which such exact discrimination cannot be exercised and it is in those circumstances that the all-round effectiveness of methyl bromide is most evident. When carbon dioxide and methyl bromide are used for their "blanket" effect the superiority of the latter, measured as percentage volumes in air, may be roughly expressed as ×4 or ×5, rising in some instances, as when carbon disulphide is the fuel, to rather better than ×8. The facts tabulated appear to reflect an impressive degree of efficiency in some of the more recent fire prevention materials, until it is recalled that these are only comparative standards, matched against such primitive aids as water or sand. And, to encourage the search for even better chemical extinguishers, it should not be overlooked—"Fire Research" does not—that some of the best of the materials now being used are inconveniently toxic.

DUTCH CHEMICAL NEEDS

HOLLAND'S keen interest in the development of her chemical industries is reflected in the annual report of the Maatschappij tot Financiering van het Nationaal Herstel, which gives data of some of the large financial requirements needed for the completion of chemical projects.

The bank is a combination of State and private banks, for the promotion of industrialisation in Holland. More than one-third of the total contracted loan went to chemical industry, which held first position among the 16 groups of industries that applied for capital for new ventures. The sum involved last year was 64.274 million guilders compared with 22.417 million guilders in 1947.

The existence of adequate supplies of the three basic raw materials, hard coal, salt, and petroleum in the country, made the outlook for further chemical development hopeful, the report stated.

Chlorine and benzol, which before the war were largely exported for lack of proper application, are among the many products now being exploited for their by-products.

The output index of benzol (1938=100) amounted to 163 in 1948, that of superphosphate to 159, but, owing to consequences of war, the nitrogen index lagged behind at 81, and the production of tar, soap and sulphuric acid also did not attain previous proportions. Altogether, the total index of production of chemical industry was 104, compared with 83 in 1947. The plastic section is still in its infancy and has resorted to foreign technical assistance.

The "Herstelbank" is very hopeful of the prospects arising for chemical developments out of the two big petroleum refineries and factories in course of erection: that of Caltex in Rotterdam and of the Bataafsche Petroleum Mij. (Royal Dutch) respectively. The chemical activities of the latter are expected to have important results.

Base Metal Prices Cut

£10–£16 Less for Copper, Lead, Zinc

SUBSTANTIAL reductions in the official selling prices of copper, lead and zinc were announced on Monday by the Ministry of Supply, to take effect immediately.

The new schedule, contrasted with the previous prices per ton (in brackets) are as follows: Electrolytic copper £130 (£140); good soft pig lead £95 (£106); good ordinary brand zinc £85 (£101).

The decision follows a period in which American market prices of these metals have undergone several price reductions, bringing them to lower levels than the current reduced United Kingdom prices, and pays recognition to the complaints which have been presented in the House of Commons. The new price of tin represents the effect of two recent reductions, the first of which took place on April 4, when the figure of £106 per ton then prevailing was diminished by £5. The statement in which the Ministry announced the present re-valuation reveals that in reaching the decision regard was paid "to the present uncertainties in world markets, and to forward commitments into which the Ministry has entered in order to safeguard sterling supplies."

The reduction in the lead price is also the second this year, an abatement of £17 per ton having been made after the heavy falls in American values in March. The lower price for electrolytic copper represents the first relief afforded to consuming industries and contrasts with the up-grading effected towards the end of 1948, which added £8 to the ton price. The Ministry's buying price for rough copper slab has simultaneously been cut by £10 to £80 per ton.

SOME BIF RESULTS

A RECORD in the history of the 28 fairs was established, by a narrow margin, when the British Industries Fair closed last week.

The total number of overseas buyers visiting the displays in London and Birmingham reached 16,740 compared with 16,710 and 14,333 in the last two shows since the war.

Home trade buyers numbered more than 119,000, while public admissions totalled 103,779.

Exhibitors on the whole expressed satisfaction with the results of the fair, and reported that there were a number of overseas proposals to manufacture under licence the new products displayed.

Prices were inclined to prevent or restrict trading, according to buyers, but a more serious controlling factor was the problem of import restrictions.

Radiochemical Centre

Practical Benefits of Atomic Research

THE contribution the atomic research can make to the benefit of mankind is disclosed in the recently completed laboratories of the Ministry of Supply, Radiochemical Centre at Amersham.

The centre, which handles some of the radioactive materials created at the Atomic Energy Research Establishment, Harwell, deals with the numerous artificial radioactive isotopes—notably radiophorous and radioiodine—which are prominent as tracer elements in the study of the workings of the human body, diagnosis of illness, and in some cases treating disease.

The refining of radium and radon and other radioactive materials occurring naturally in the earth is also carried out.

Since 1946 when the Ministry of Supply took over the original establishment from Thorium, Ltd., about 100 grammes of radium have been produced at Amersham. This is about one-tenth of the total amount of radium in the world before the war, and represents a value of £500,000.

Among the new equipment on view at the centre last week was a device for filling fine gold tubes of 1.1 mm. diameter with radon for the treatment of cancer.

RADIATION ADVISORY COMMITTEE

SIR HENRY DALE, former president of the Royal Society, has been appointed chairman of the Radioactive Substances Advisory Committee, composed of scientific and medical experts, which will advise on protective measures against radioactivity, and the safeguarding of workpeople and the public generally against the danger of exposure to radiation from radioactive substances and certain irradiating apparatus.

The committee has been appointed by the Minister of Health, the Secretary of State for Scotland, the Minister of Supply, and the Minister of Health and Local Government for Northern Ireland. Besides the chairman, members include the following:—

J. P. Baxter, Imperial Chemical Industries; W. Binks, F.Inst.P., National Physical Laboratory; Sir Ernest Rock Carling; D. G. Catcheside, Botany School, Cambridge; Lord Cherwell, F.R.S., Clarendon Laboratory, Oxford; Sir John Cockcroft, Atomic Energy Research Establishment, Harwell; Professor N. Feather, Department of Natural Philosophy, Edinburgh University; J. F. Loutit, Radiobiological Research Unit, Harwell; Professor W. V. Mayneord, Royal Cancer Hospital; Professor R. McWhirter, Radiology Department, Royal Infirmary, Edinburgh; E. R. A. Mereweather, Senior Inspector of Factories; Ralston Paterson, Holt Radium Institute, Manchester; H. S. Souttar; Sir George Thomson, Imperial College of Science, South Kensington; Professor B. W. Windeyer, Meyerstein Institute of Radiotherapy, Middlesex Hospital.

Obsolete Plant and Processes

An Attempt to Re-Plan Rumania's Chemical Industry

DECLINING production, attributable to obsolescence or deterioration of installations, some of which are regarded as being almost entirely ineffective, is the outstanding factor revealed in a recent survey of Rumania's chemical industry.

The chemical industry section of the Rumanian Superior Economic Council has mobilised specialists to study the problems requiring urgent solution, but it was pointed out that 1948 would be a transitory period during which efforts were being made to remedy the output problem by replacement of existing equipment.

An Optimistic View

Despite these problems, however, an optimistic view of the future of Rumania's chemical industry and the trend of developments was indicated in an article entitled "The Rumanian Chemical Industry" which appeared last year in the semi-official publication *Probleme Economice*.

So little information is available from the satellite countries of the U.S.S.R. that, although the accuracy of statements and figures cannot be verified, the abstracts from this article, reproduced in *Mineral Trade Notes* (*26*, 6; United States Department of the Interior), are of considerable interest.

Rumania, the report claims, has certain raw materials such as wood, coal, petroleum, natural gas, salt and ores, that would serve as basic materials for an expanded industry, but additional equipment is required to take advantage of them.

This development is considered to be of primary importance to the economic progress of the country and wide research is recommended and a closer contact with the science and technique of more advanced countries.

Metallic Ores

Researches for obtaining alumina from bauxite in Bihor should be continued, while although they have a metallurgical aspect, extraction and chlorination of metals from gold ores by the wet process, and obtaining magnesia from dolomite, are considered to be problems for the chemical industry.

The most important ores are iron pyrites and zinc blende, yielding as they do, sulphur gas for the manufacture of sulphuric acid.

The country's salt deposits are reputed to be, in Europe, second only to those of the Soviet Union. It is an essential raw material for the heavy chemical industry for which it supplies soda and chlorine. Both the Solvay and electrolytic processes are used in Rumania.

Considerable importance is attached to the deficiency of trained workers in the chemical industry. Training of medium technical staff, chemical sub-engineers, laboratory assistants it is suggested should be given in regional schools where more attention would be given to the special requirements of the chemical industries of individual regions.

The report also points out the deficiencies in the superior chemical schools which have been developed, consciously or unconsciously, on the theoretical side to the detriment of practical applications and the neglect of proper co-operation between plants and research laboratories. Because of this the economic sector was left to the initiative and direction of foreign trusts.

Northern-Rhodesian Cobalt

ECA to Assist Production

THE U.S.A. is to help Britain increase its production of cobalt in return for a five-year option to buy 10 per cent of the increased output. This assistance will consist of a $550,000 authorisation by ECA to finance procurement of American-made plant items for use in expanding the Northern-Rhodesia plant of the Rhokana Corporation, the British cobalt-producing company. By procuring the plant in the U.S.A., the Rhokana Corporation will be able to complete its expansion programme 18 months ahead of its original schedule, which was based on procuring the machinery in the United Kingdom.

Nitrogen from Oil Gas ?

Commenting on an article from Dhahran, Saudi Arabia, appearing in the *New York Times* (April 15), which suggested that nitrogen sufficient to meet the world's fertiliser needs could be procured by using natural gas now burned as waste in the oil fields, headquarters of the FAO said that it had no previous knowledge of the article and that no authorisation had been given for issuance of a statement by the FAO. It was expected that the current preliminary survey of production possibilities in the countries of the Near East will be completed by May 31.

SULPHURIC ACID PRODUCTION

Summary of First Quarter of 1949

A GENERAL increase in production and consumption of sulphuric acid and oleum in the United Kingdom was shown in the first three months of this year according to the classified summary issued by the National Sulphuric Acid Association, Ltd. Comparative figures were: Production: 424,702 tons, January-March, 1949, against 415,958 tons, October-December, 1948. Consumption: 442,651 tons, January - March, 1949, compared with 414,795 tons in the last quarter of last year.

The main increases in consumption of individual items in the first quarter of 1949 were: Superphosphates 142,709 tons, compared with 126,643 tons in the preceding three-monthly period, and paint and lithopone 23,644 tons against 18,836 tons, October-December, 1948. The official summary is reproduced in the table below.

SULPHURIC ACID AND OLEUM

Tons of 100% H_2SO_4

	Chamber only	Contact only	Chamber and Contact
Stock, Jan. 1, 1949	36,962	30,800	67,762
Production ...	199,452	225,250	424,702
Receipts	50,454	11,158	61,612
Oleum feed ...	—	2,581	2,581
Adjustments ...	+27	−23	+4
Use	131,340	86,309	217,649
Despatches ...	124,801	160,406	285,207
Stock, Mar. 31, 1949	30,754	23,051	53,805
Total capacity represented ...	214,020	235,180	449,200
Percentage production	93.2%	95.8%	94.5%

RAW MATERIALS

Tons

	Pyrites*	Spent Oxide	Sulphur and H_2S	Zinc Concentrates
Stock, Jan. 1, 1949	65,219	169,549	57,226	16,457
Receipts	95,019	53,686	77,365	37,988
Adjustments ...	+231	−64	−758	−19
Use	85,841	49,164	73,488	39,177
Despatches ...	155	4,539	117	29
		297†		
Stock, Mar. 31, 1949	74,473	169,171	60,228	15,220

* "Receipts" and "Use" include anhydrite "converted" to pyrites.

† Used at works for purposes other than sulphuric acid manufacture.

CONSUMPTION OF SULPHURIC ACID AND OLEUM
UNITED KINGDOM AND EIRE

January 1—March 31, 1949

Trades	Tons 100% H_2SO_4
Accumulators	2,372
Agricultural purposes	124
Bichromate and chromic acid	2,795
Borax and boracic acid ("Unclassified") ...	
Bromine	3,757
Chlorsulphonic acid ("Unclassified")	
Clays (Fuller's earth, etc.)	2,172
Copper pickling	750
Dealers	4,434
Drugs and fine chemicals	2,723
Dyestuffs and intermediates	19,906
Explosives	2,951
Export	852
Formic acid ("Unclassified")	
Glue, gelatine and size	268
Hydrochloric acid	16,007
Hydrofluoric acid ("Unclassified")	
Iron pickling (incl. tin plate)	23,853
Leather	1,597
Metal extraction	490
Oil (mineral) refining	11,943
Oil (vegetable) refining	3,231
Oxalic, tartaric and citric acids ("Unclassified")	
Paint and lithopone	23,644
Paper, etc.	898
Phosphates (industrial)	1,182
Plastics, not otherwise classified	3,284
Rare earths ("Unclassified")	
Rayon and transparent paper	44,718
Sewage	2,717
Soap and glycerine	1,269
Sugar refining	146
Sulphate of alumina ("Unclassified")	
Sulphate of ammonia	65,251
Sulphate of barium	1,214
Sulphate of copper	5,768
Sulphate of magnesium	1,510
Sulphate of zinc	849
Superphosphates	142,709
Tar and benzole	4,265
Textiles	5,971
Unclassified—Uses known	26,012
Uses unknown	11,019
Total	442,651

FEWER FATAL ACCIDENTS

THE numbers of fatal industrial accidents and of deaths from industrial diseases in March are reported in the *Ministry of Labour Gazette* (Vol. LVI, No. 4, April).

Deaths from accidents in the course of employment in the United Kingdom were 116 in March, compared with 119 the previous month of this year, and 143 (revised figure) in March, 1948. There were only three fatal accidents in the chemicals, oils and soaps, etc., while metal extracting and refining, and metal conversion accounted for 11, and other metal trades four.

Cases reported under the Factories Act, 1937, or the Lead Paint (Protection against Poisoning) Act, 1926, in the U.K. in March showed one death from epitheliomatous ulceration (skin cancer) in the tar industry. Cases were detailed as follows: lead poisoning, 10. Other poisoning: epitheliomatous ulceration (pitch) 10; (tar) 12; (oil) 2. Chrome ulceration: (manufacture of bichromates) 1; (chromium plating) 10; (other industries) 1.

Chemical Materials in February

More Sulphuric Acid : Less Use of Metals

FEBRUARY showed little change in the production and consumption of basic chemicals, although in most cases there were appreciable improvements in stocks and the call for sulphur and sulphuric acid has expanded. Production of compound fertiliser was higher than in the previous month, though not so high as in February, 1948, according to the last issue of the *Monthly Digest of Statistics* (No. 40, April, 1949, HMSO 2s. 6d.). Virtually all non-ferrous metals were in rather lighter demand.

Total estimated numbers employed in the chemical and allied industries during February, 1949, were given (in thousands) as 431.1, distributed as follows:—coke-ovens, chemicals and dyes, explosives, etc., 250.4 (183.9 men, 66.5 women); oils, greases, glue, etc., 63.8 (50.6 men, 13.2 women); paints and varnishes 37.1 (26.2 men, 10.9 women); pharmaceutical, toilet preparations, etc., 79.8 (40.5 men, 39.3 women). These figures were slightly higher than in January this year.

Representative tables are given below.

	February, 1949 Thousand Tons			February, 1948. Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	144.9*	134.0	—	135.0	124.0	—
Sulphur	—	26.0*	69.9*	—	22.9*	*85.0*
Pyrites	—	20.8*	74.0*	—	20.8*	69.0*
Spent oxide	—	16.3*	168.9	—	16.7*	166.0*
Molasses (cane and beet)	7.2	19.4†	269.3	8.8	21.9†	217.2
Industrial alcohol (mil. bulk gal.)	1.39	2.17	6.28	1.52	2.67	8.23
Superphosphates	18.4	21.5	—	19.0	27.5	—
Compound fertiliser	150.6	204.5	—	158.3	210.1	—
Liming materials	—	352.9	—	—	325.0	—
Ammonia	—	7.08*	4.45	—	6.37*	5.02
Phosphate rock	—	89.6	165.5	—	81.20	158.8
Virgin aluminium	2.4	16.5	—	2.29	14.0	—
Virgin copper	—	30.3	105.1	—	29.3	97.3
Virgin zinc	—	16.9	39.8	—	18.7	33.7
Refined lead	—	17.4	21.3	—	18.0	40.3
Tin	—	1.82	18.8	—	2.47	15.3
Zinc concentrates	—	12.4	26.0	—	13.7	65.0
Pig iron	179.0*	—	246.0*	179.0*	—	174.0*
Steel ingots and castings (including alloys)	313.0*	—	1,000.0	291.0	—	749.0
Rubber: Waste collected	—	—	—	—	—	—
Reclaimed	0.37	0.45	3.97	0.49	0.48	4.02
Natural (including latex)	—	5.25	45.1	—	4.37	131.8
Synthetic	—	0.05	1.87	—	0.06	1.99

* March. † Distilling only.

More Potent Insecticides : French Claims

TWO French chemists working in Morocco have discovered and developed insecticides, which they claim are more potent than existing formulations and are at the same time the least toxic to man. A French correspondent states that their application is expected to be of importance to a variety of industries, including textiles, furs, carpets, paper, wood, food, etc.

The insecticides are classed as nitrile-alcohol lipo-solubles. They are a derivative of hydrocyanic acid, but are said to be quite inoffensive to man and other warm blooded animals.

Comparison with two of the most powerful commercialised insecticides used to-day, HCH and DDT is said to have shown the following results:—

	NALS 2 %	HCH 8 %	DDT 10 %
Efficacy	100	25.05	5.14
Toxicity	100	2.700	25.300

The new products are also claimed to have two other advantages: that they sterilise soil and, while destroying inferior organisms, they maintain the permeability and aeration and ensure the mixing of arable layers and do not destroy the indispensable nitrifying bacteria. They are said finally to undergo transformation into ammoniacal salts, *i.e.*, assimilable nitrogen manure.

The insecticides may use as a vehicle surplus oil of Moroccan sardines, an abundant by-product of local canning plants. In France other vehicles will be used, such as aldehydes or halogenated cetones.

Chemical Engineering

DSIR Research Committee

THAT chemical engineering research in Britain has lagged behind that in America in recent years, is pointed out in a statement issued this week by the Department of Scientific and Industrial Research. Although the country has an incentive for the work in world wide markets for chemical plant, as well as trained men to carry it out, apparently not much is being done, the statement continues. Britain is still in the forefront of fundamental research and there seems no reason why we should not make a bigger contribution to chemical engineering knowledge than we are doing now.

Investigation

Following on a suggestion by the Institution of Chemical Engineers, the DSIR, as recently announced (THE CHEMICAL AGE, *60*, 528), has set up a committee to investigate research in this field. The committee will survey what work is going on at the moment, what further work may be desirable, and recommend where and how this might be done.

The constitution of the committee is as follows:—

Mr. H. W. Cremer (chairman), past president, Institution of Chemical Engineers; Prof. T. C. R. Fox (Cambridge University); Prof. F. H. Garner (Birmingham University); Mr. H. Griffiths (British Carbo Norit Union); Dr. N. P. Inglis (I.C.I.); Mr. N. Neville (British Chemical Plant Manufacturers' Association); Prof. D. M. Newitt (Imperial College of Science, London), president of the Institution of Chemical Engineers; Mr. J. A. Oriel (Shell Marketing and Refining Company); Mr. J. Davidson Pratt (Association of British Chemical Manufacturers); Mr. S. Robson (consultant, Zinc Corporation Group).

Official Groups

Government science will be represented by the following: Sir Charles Darwin, director, National Physical Laboratory, DSIR; Dr. R. P. Linstead, director, Chemical Research Laboratory, DSIR; Dr. A. Parker, director, Fuel Research Station, DSIR; Dr. S. A. Hankins, director, Mechanical Engineering Research Organisation, DSIR; Dr. F. J. Wilkins, principal director of scientific research, Ministry of Supply; Dr. F. A. Williams, Ministry of Fuel and Power; Dr. J. F. Hirst, Board of Trade.

The secretary of the committee is Mr. A. W. Morrison, DSIR.

Plastics and Polymer Group

Widened Sphere of SCI Organisation

CONSIDERABLE widening, both theoretical and technoligical, has been made in the subjects covered by the Plastics Group of the Society of Chemical Industry since its inauguration 17 years ago.

In particular, the chemistry of polymerisation and of polymers (using the terms in their broadest sense) has developed in many directions, and the group now states that for some time it has been considered that the name "Plastics Group" should be modified to indicate better the wide scope of the group's present interests.

After carefully weighing the views of members, the committee decided to put forward before the group at the annual general meeting a motion that the consent of the council should be sought to a change in the title of the Plastics Group to Plastics and Polymer Group.

The seventeenth annual general meeting will be held on Tuesday, May 31, at Reuben's Hotel, Buckingham Palace Road, S.W.1, at 5.0 p.m., to be followed at 7.0 p.m. by an informal dinner at which Mr. Edward A. O'Neal, Jun., chairman, Monsanto Chemicals, Ltd., will be the chief guest.

SCOTTISH WOOL RESEARCH

THE appointment of chemists and physicists to the staff of the Scottish Woollen Technical College, announced by Mr. Arthur Woodburn, Secretary of State for Scotland, during his visit to Galashiels last week, marks a further step in the long co-operation between the Scottish woollen industry and the British Wool Industries Research Association, Leeds.

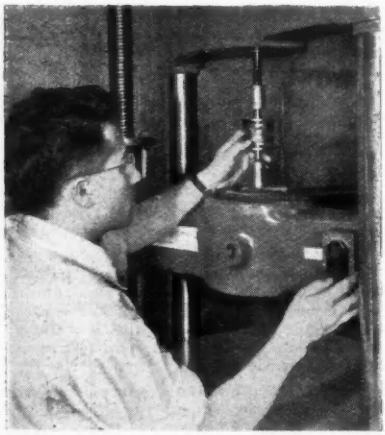
Laboratory accommodation will be provided by the college at the production unit and there will be close personal relationship between the staff and the research association staff.

Funds for research at the college have been provided by the International Wool Secretariat, and a qualified scientist has been engaged for three years to assist the principal in carrying out research work.

Mr. Woodburn said his own experience led him to believe that there must be the closest association in industry between research and practice, and one of the principal effects of the new development would be to eliminate the gap between the results of research and their practical application.

THE NATURE OF ADHESION

Some Results of the Initial Stage of U.S. Research



Positioning an adhesion specimen in a universal hydraulic testing machine prior to testing under controlled conditions of temperature and relative humidity

THE dearth of comprehensive data on both the nature and theory of adhesion has led the U.S. National Bureau of Standards to undertake an extensive investigation of the adhesive properties of a variety of adhesives and adherends. The first results of this research, conducted in the Bureau's organic plastics laboratory, seem well designed to lead to a better understanding of the specific attraction between various types of materials, and to a more complete knowledge on the nature of adhesion.

Among the adhesives included in the investigation were cellulose nitrate, polyvinyl acetate, resorcinal-formaldehyde, casein, gum arabic, natural rubber, and neoprene. These were modified as little as possible so that the relation between adhesive and adherend would be due to the simplest possible combination.

The adherends chosen, aluminium alloy, stainless steel, paper phenolic laminate, plate glass, birch wood, and hard rubber, fairly representative of the materials of industry, have a wide range of elastic moduli—the property best correlated with bond shear strength—and their chemical and physical structure make possible a variety of adhesive bonds.

Test specimens were prepared, using each adhesive in turn with each adherend; only one adherend was used in any one specimen. The proper treatment of the adherend surfaces was found to be of primary importance since, when exposed to ordinary atmospheric conditions, they usually pick up impurities in the form of oxide, dust, or oil films. If dirt or impurities are present, close contact between the adhesive and the base adherend surface is prevented and the best adhesive action is not obtained.

Surface Cleaning

Prior to preparation of metal-adherend specimens, the surfaces were cleaned of oil and grease by rinsing in volatile organic solvents followed by pickling in acid to remove any loose oxide film. The glass surfaces were prepared by soaking in a sodium dichromate-sulphuric acid solution, then rinsing with water. Birch wood, phenolic laminate, and hard rubber were sanded with No. 00 sandpaper.

Specific bonding conditions for the test assemblies were developed for each adhesive, depending on the chemical and physical nature of the adherend. These conditions ranged from 3 p.s.i. pressure, for a gum arabic adhesive, dried 20 hours at 25°C., to 150 to 200 p.s.i. pressure for a rubber adhesive cured 7 hours at 140°C.

The specimens, after conditioning for a minimum period of seven days at a temperature of 25°C. and 50 per cent relative humidity, were tested at the same temperature and humidity for shear, tension, impact, and fatigue properties. All combinations were subjected to the shear and tensile tests. The impact test provided a means for studying differences between a brittle and a rubbery bond, and the fatigue test was utilised to investigate how a thermosetting and a thermoplastic bond differ.

Shear-strength Determinations

Excluding glass specimens bonded with polyvinyl acetate and cellulose nitrate, a tensile shear load, applied to a double-lap-joint specimen, was used in every case for the shear-strength determinations. Glass proved too brittle when subjected to tensile-shear loads of more than 200 to 300 lb. p.s.i. However, compression-shear specimens were able to withstand loads of more than 2500 lb. p.s.i.

Tensile-adhesion values were obtained by using dumb-bell-shaped specimens with contact areas of 1, ½ and ¼ sq. in., when the

adherends were much weaker than the adhesives, dumb-bell-shaped specimens with the smaller contact areas were prepared in order that the specimens would fail at or near the bond interface.

The rate of loading in both the shear and tensile tests was adjusted within the limits of 200 to 1000 lb. per minute so that failure of the bond would occur after approximately three minutes. Thus the time of fatigue would be about the same for all specimens.

The fatigue properties of thermoplastic and thermosetting resins were studied by using a double-lap tensile-shear specimen with a half-inch overlap. By varying the width of such specimens—to which a 50 or 100 lb. weight was attached—a range of shear stresses from 200 to 1300 lb. was obtained. Impact-resisting properties of rubbery and brittle cements were compared, using single-lap specimens of both aluminium alloy and wood. These specimens were broken with a pendulum impact machine of 2 ft./lb. capacity.

An evaluation of the data gathered in this project was obtained by tabulating the results with respect to two fundamental properties of the materials involved. These are the dielectric constant and the modulus of elasticity. The dielectric constant was considered to be of possible importance, since modern theories attempt to explain adhesion on the basis of electrical forces.

The tabulations tended to show greater correlation with the moduli of elasticity than with the dielectric constants. When

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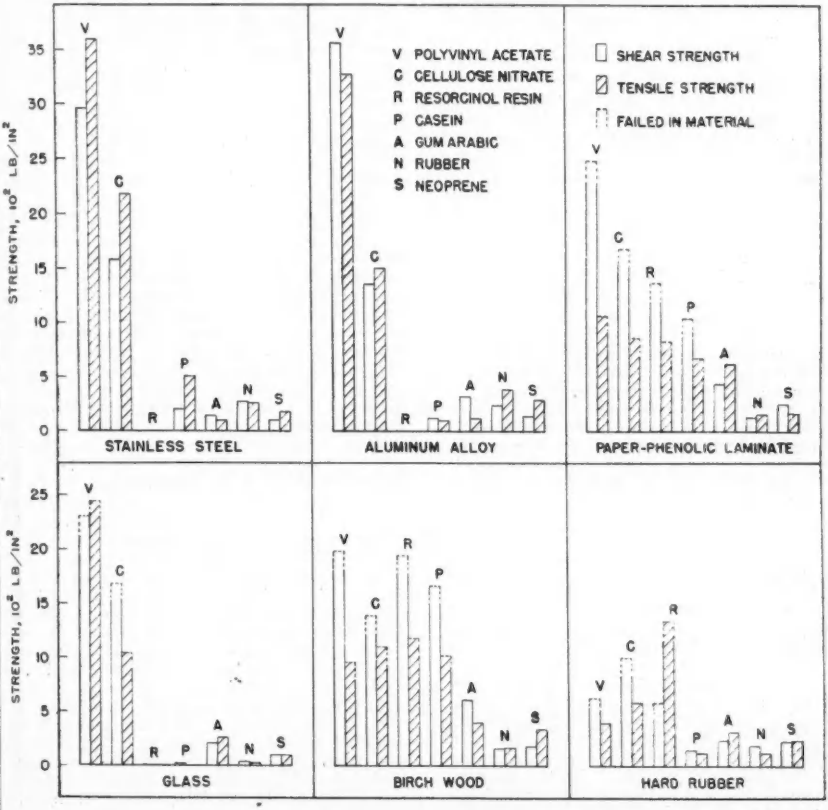


COMPARATIVE BOND STRENGTH VALUES GROUPED ACCORDING TO ADHERENDS USED

British Standard Resisting Materials

Protective Clothing and Insulators

FLAMEPROOF industrial clothing is the subject of a British Standard newly issued by the British Standards Institution.

The clothing covered by this standard (B.S. 1547 : 1949) is not fireproof clothing, intended to resist prolonged contact with flame, but clothing made of fabrics treated with soluble deposits which increase the resistance of the fabric to fire, so that it is incapable of propagating flame.

The standard is based on the expected use for most industrial processes in which flameproof protection is required, of textile materials (usually cotton) flameproofed by the deposit of soluble salts. Typical processes are welding, forging, annealing and those in which combustible materials are handled.

Marking of flameproofed material and freedom from injurious substances are dealt with, and the essential points in the design of clothing specified, while recommendations on the maintenance of clothing are also included.

Two other newly-published British Standards are in the series for moulded electrical insulating materials. These are B.S. 1539 "Moulded electrical insulating materials for use at high temperatures," and B.S. 1540 "Moulded electrical insulating materials for use at radio frequencies."

B.S. 1539 deals with moulded electrical insulating material for use where temperatures may exceed 180°C. It defines three broad classes of material: (1) arc-resisting, (2) non-ignitable, (3) self-extinguishing. The standard specifies requirements for the electrical and mechanical properties of each of these classes and standard methods of test for these properties.

B.S. 1540 covers moulded electrical insulating materials for use under working conditions where they may be subjected to alternating electric fields having a frequency greater than 10,000 cycles per second. It deals with six classes of materials—fused silica, vitreous materials, ceramic materials for insulators, ceramic materials for dielectrics, rubber-base materials, and synthetic resins.

THE NATURE OF ADHESION

(continued from previous page)

a high-modulus adhesive was used with a high-modulus adherend, the bond strength was negligible. When a low-modulus material was used, its strength became the limiting factor in the strength of the bonded assembly. The best results were obtained when medium-modulus materials were used with each other or with high-modulus materials. For instance, resorcinol formaldehyde, a high-modulus adhesive, provided no adhesive action with glass and metals, both of which are high-modulus adherends. However, it gave good results with wood, a medium-modulus adherend. Polyvinyl acetate, a medium-modulus adhesive, gave consistently good values with all the adherends.

Results of these investigations indicate that there are many variables involved in adhesion and that the breaking stress of a specimen is not always a measure of the adhesive-adherend bond strength. Instead it may be a measure of the cohesive strength of the adhesive or the adherend. A break at the adhesive-adherend interface, for example, may be attributed not so much to lack of adhesion as to the overshadowing effects of strains produced by temperature differentials or by adhesive layer shrinkage due to solvent evaporation.

Chemical action between the adhesive and the adherend may also result in loss of strength in the bond assembly. This may be due to the weakening of the adhesive or adherend because of the chemical action or it may be due to the formation of a weak chemical layer at the interface.

As already mentioned, most present theories relate adhesion to electrical forces. Such forces, which may arise from hydroxyl, acetate, nitrate and other polar groups, may be important in pure adhesion, but they tend to become secondary in an actual bonded assembly where other variables are of prime importance. The electrical forces, nevertheless, are probably the basic forces of adhesion and are always present.

The problem therefore becomes one for which a means must be found to modify the other variables in order to make the fullest use of the basic attractive forces. For a more thorough study of adhesion, it is necessary to separate these variables, whether electrical or mechanical, and to study each separately.

At the present time, with this idea in mind, a programme of extended research is being planned by the Bureau of Standards. For the time being, an attempt is being made to evaluate the importance of various polar groups by studying their heats of wetting properties.

SCIENTIFIC APPROACH TO FIRE RISKS

Behaviour and Treatment of Burning Liquids

THE accidental ignition of liquids, although not exclusively a problem of the chemical industry, looms sufficiently large in the background of many phases of industrial chemistry to warrant more intimate study than it has yet received. Some of the deficiencies in this department of research are now being made good by the Fire Research Board, successor of the war-time body concerned with this aspect of national defence and maintained by the Department of Scientific and Industrial Research and the Fire Offices' Committee.

Petroleum Products

The scope of activities in 1947 is now reviewed in "Fire Research, 1947" (HMSO, 1s. 3d.), a large section of which is concerned with fundamental matters associated with the burning of liquids and studies of methods and materials for extinguishing such fires.

The present report recalls that earlier work was undertaken during the war, impelled by effects of enemy bombing raids, and investigations were undertaken to establish the fundamental principles involved in the burning of petroleum products in bulk.

As a result of small scale experiments carried out in a 40 gal. tank it was shown that most refined oils with a limited distillation range burn in such a manner that all the fractions in the burning layer are burnt away, leaving little or no residue, and the bulk of the oil below the burning layer is unaffected by the fire.

By contrast, with oils having a relatively wide distillation range, such as petrolcum crudes or residual oils, the combustion takes place in such a way that the lighter fractions only are removed from successive layers, and a hot residue is left which floats on the main bulk of unaffected oil.

Oil Froth

The hot zone, which steadily increases in depth with prolonged burning of the oil, reaches a temperature which in the case of some oils considerably exceeds 100°C. and thus constitutes a considerable hazard, particularly if extinction of the fire by the use of any form of water is attempted, since a "slopover" of the frothing hot oil will then probably occur.

Even in the absence of added water a violent "boilover" may occur when the hot residue reaches the tank bottom, due to the violent vaporisation of water in the aqueous sludge which is always present, resulting in the ejection of oil froth with considerable violence.

In addition to the small-scale experiments, further work was carried out with Pool fuel oil in a 6000 gallon tank, 9 ft. in diameter, the results from which confirmed, at least qualitatively, those obtained with the smaller tank. The large-scale work was carried out at the Llandarcy refinery of National Oil Refineries, Ltd., with the co-operation of the company and its technical staff.

Methods of overcoming the hazard due to the formation of the hot zone were studied and it was shown that by stirring or other means of circulation the cold oil below the hot zone could be used to cool the hot zone and even to extinguish the fire completely.

The study of hot zone formation has raised a number of questions which could not be satisfactorily answered by the relatively large-scale experiments carried out prior to 1947. During the past year, experiments were carried out in a 40-gallon tank at Llandarcy with the object of elucidating some of the factors involved in hot zone formation.

Experimental Conditions

The apparatus, however, proved to be not entirely suitable for this purpose and more recently an attempt has been made to reproduce the phenomenon on a laboratory scale, and some success has already been achieved in the choice of experimental conditions to reproduce hot zone formation in the laboratory. This will aid further studies of the hazards of different types of oils.

Recognition of the hazard of slopover which is occasioned by the application of water in any form, including foam, to the surface of burning oil with an appreciable depth of hot zone led during the war to the suggestion that a safer method would be to inject foam at the base of the tank. A closer study of the hot zone indicated, however, that frothing of the burning oil would occur whether the water (including foam) was brought into contact with the hot zone either from above or from below.

Experiments have therefore been carried out during 1947 to determine (a) the quantity of foam required to effect extinction, and (b) the depth of the layer of froth produced when foam is applied to oil fires. The experiments were carried out using Pool fuel oil and introducing foam by two

methods—at the top of the tank, and by base injection.

The results for the first method showed that for a given rate of application of foam (by weight) the extinguishing effect and the depth of froth produced were both independent of the expansion ratio of the foam. The process of extinction would appear to depend mainly on the cooling of the hot zone, and the amount of foam required to effect extinction could be accounted for by the amount necessary to cool the oil in the hot zone, together with that required to absorb the radiant heat from the flames.

The oil was allowed to burn for 15 minutes before the foam was applied. On the application of foam the froth produced increased up to a maximum value corresponding to a fourfold expansion of the hot zone; further addition of foam produced no increase in the forth. The effect of increased times of burning before application of the foam could not be determined owing to limitations set by the apparatus.

Base Application of Foam

Similar results were obtained by the base application of foam, but in addition to the cooling effect of the foam itself, further reduction in the temperature of the hot zone was achieved by the agitation of the bulk of the oil which resulted in the mixing of cool oil from the base of the tank with the oil in the hot zone. The extinction process was therefore considerably accelerated by comparison with the first method.

With the same period of burning before application of the foam the maximum depth of froth produced was about twice that observed with top application of foam. With longer periods of burning prior to the application of foam, and the consequent increase in the depth of hot zone the temperature of the whole bulk of oil on mixing rose to over 100°C. and violent and persistent slopovers occurred.

Grades of Oil

In addition to the detailed study of the application of foam to burning fuel oil, described above, a survey was carried out of the effect of foam with various grades of oil, including motor spirit and lubricating oil; it was also hoped to gain some insight into the mechanism of extinction of oil fires by foam.

The results obtained with various grades depended on the viscosities of the oil, the surface temperature, and the formation or absence of a hot zone. Extinction was caused by the lowering of the surface temperature below the flash point of the oil, where this exceeded 100°C.; where the flash point was below 100°C. extinction occurred following the formation and persistence of a layer of foam over the surface of the burning oil.

Another very relevant branch of the current studies is concerned with the relative effectiveness of extinguishing materials, of which results produced by work in 1946 have now been published. They are concerned with the alternative methods, using media such as carbon tetrachloride or carbon dioxide, of applying the extinguisher

(*Continued at foot of next page*)

(*a*) EXTINGUISHER ADDED TO AIR (PERCENTAGE OF VOLUME)

Combustible	Carbon dioxide	Methyl bromide	Freon 12	Carbon tetrachloride
n-Hexane	22	5.4	10.5	6.8
Cyclohexane	23	5.6	—	5.1
Benzene	23	3.8	—	4.0
Ethanol	30	6.2	—	10.3
Di-ethyl ether	32	5.5	—	9.2
Acetone	22	5.3	—	7.5
Acetaldehyde	32	5.0	—	9.2
Ethyl acetate	23	4.5	—	7.4
Carbon disulphide	64	7.6	—	2.0
Liquid methane	30	4.8	—	11.2

(*b*) EXTINGUISHER ADDED TO COMBUSTIBLE LIQUID
(Ratio by weight of inhibitor to combustible)

Combustible	Carbon tetrachloride		Methyl bromide		Water	
	Extinction	Inhibition	Extinction	Inhibition	Extinction	Inhibition
n-Hexane	5.3	6.5	0.21	0.29	—	—
Cyclohexane	3.0	3.5	0.20	0.165	—	—
Benzene	1.6	1.9	0.24	0.20	—	—
Ethanol	1.5	1.3	0.05	0.04	6.5	2.3
Di-ethyl ether	10.6	12.6	0.82	0.81	—	—
Acetone	3.5	8.0	0.41	0.24	20	7
Acetaldehyde	20.5	30.0	0.95	1.20	—	16
Ethyl acetate	2.5	2.0	0.19	0.11	—	—
Carbon disulphide	6.3	7.2	0.15	0.20	—	—

Declining Use of Coal Products in U.S.A.

Heightened Competition from Natural Gases

PRODUCTION of coke from coal-gas retorts in the U.S.A. in 1948 decreased 20 per cent from 1947 and totalled 529,374 net tons. This is shown in reports received from producers by the Bureau of Mines, U.S. Department of the Interior.

The manufacture of retort coke, the secondary product, has been declining steadily in recent years because of the substitution of water gas, natural gas, or liquefied petroleum gases for coal gas. For example, in 1942 there were 96 coal-gas plants in operation which produced 892,552 tons of coke, while in 1948 only 36 plants reported production. Thus, in the past six years 60 coal-gas plants have discontinued operations, 1530 retorts have been abandoned, and the annual coal carbonisation capacity of the industry has been lowered by 881,500 tons.

Changing Plant

Horizontal retorts, which were the predominant type of carbonising equipment used in the early days of the coal-gas industry in the U.S., have been dropping out of production at a more rapid rate than the later vertical or semi-inclined type. At the end of 1942 there were 1881 horizontal retorts in operation and they produced 41 per cent of the total output of retort coke, while at the end of 1948, 543 horizontal retorts were reported in operation and they accounted for only 31 per cent of the national output.

Higher Priced Coal

The total quantity of coal carbonised in 1948 declined 18 per cent from the 1947 figure, while the average value per ton increased 24 per cent over 1947 and was 72 per cent higher than the 1943 average.

Although the average yield of coal-gas tar increased slightly in 1948, the total quantity produced declined 17 per cent from 1947 because of the big drop in coal consumption. The vigorous market for tar in 1948 is reflected in the increase in average unit value of sales. The average valuation at producing plants was $0.078 per gal., a gain of $0.02, or 34 per cent, over 1947.

Most of the coal-gas tar sold is purchased by tar refineries for processing into tar products. Sales of coal-gas tar for use as fuel are small, amounting to less than 6 per cent of the total.

SCIENTIFIC APPROACH TO FIRE RISKS

(*Continued from previous page*)

as a gas or vapour, or by addition of the extinguisher to the inflammable liquid

In a series of experiments determinations were made of :—

(a) The proportion of extinguisher (per cent by volume) which is necessary in the air to extinguish the flame of a burning liquid;

(b) the proportion of extinguisher (per cent by weight) which it is necessary to add to a liquid to (i) extinguish the flame ("extinction"); (ii) to make the vapour above the liquid incapable of being ignited ("inhibition").

The results of (a) and (b) are given in the tables shown on the previous page.

The first table shows the marked superiority of methyl bromide and carbon tetrachloride as compared with carbon dioxide, where an intrinsic capacity of the extinguisher to inhibit flame propagation is the controlling factor. In this respect carbon tetrachloride and methyl bromide are of the same order of efficiency but in the experiments in which the extinguisher was added to the burning liquid itself the effect of the greater volatility of methyl bromide is clearly shown.

Some of the extinguishing media mentioned above are toxic. This aspect is beyond the scope of the present report but it is obviously of the highest importance in any proposal to use the media in practical fire extinction.

The normal method of application of an extinguisher, however, is in the form of a spray, so that part of the liquid is evaporated by the flames and acts as a gas or vapour added to the vapour phase, while the remainder reaches the surface, and as in most cases it is at a lower temperature than the burning liquid it exerts a cooling influence on the burning liquid.

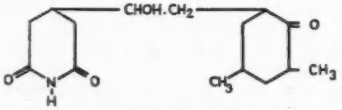
Finally the solution of the extinguisher in the burning liquid may result in an extinguishing action by virtue of its influence on the composition of the vapour in equilibrium with the liquid. The relative importance of these three factors has therefore been studied in a preliminary series of experiments carried out during 1947 on the use of water sprays on burning liquids, in order to determine the most favourable method of application. Detailed results are awaited.

Progress in Medicinal and Fine Chemicals—VIII

Important New Therapeutic Weapon

by G. COLMAN GREEN, B.Sc., F.R.I.C., A.M.I.Chem.E.

AN interesting antibacterial substance also produced by *Streptomyces griseus* was isolated by Ford and Leach (*J. Amer. Chem. Soc.*, 1947, *69*, 474; *ibid*, 1948, *70*, 1223) and named actidione. Its most striking feature was its activity against almost all yeasts and its inactivity towards other micro-organisms. Subsequently, the antibiotic was isolated from streptomycin residues. Kornfield and Jones (*Science*, 1948, *108*, 437) have examined actidione and bring evidence in favour of the following molecular structure :—



Actidione

Among the antibiotics produced by the Aspergillus family of moulds is aspergillic acid which was first isolated by White and Hill (*J. Bact.*, 1943, *45*, 433). It is active against a number of gram-positive and gram-negative bacteria and against *Mycobacterium tuberculosis*.

It is, however, sensitive to trace metals and loses activity in body fluids. Dutcher and Wintersteiner (*J. Biol. Chem.*, 1944. *155*, 359) have suggested that it is 2-hydroxy -3 : 6-di *sec*-butylpyrazine (I). Spring, Newbold and Dunn (*Nature*, 1948, *162*, 779) now bring evidence to show that the structure is more likely to be II or III.

Johnson (*Science*, 1945, *102*, 376) it is somewhat toxic, but appears to be effective in animal studies with certain gram-positive pathogens. Johnson has now described the preparation and partial purification of bacitracin (*J. Bact.*, 1948, *55* (2), 249).

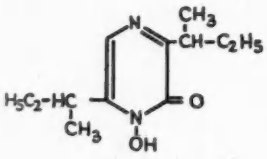
Contrary to the belief of Goorley (Conf. on Antibiotic Res., Nat. Inst. Health, 1947) Johnson thinks the antibiotic is not a polypeptide and indicates that the molecule lacks both guanido and phenolic groups.

Antibiotic Extraction

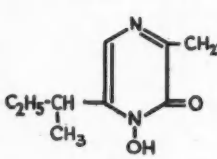
After 72 hours' incubation at 37°C. in an l-glutamic acid containing medium or a soya bean digest medium the antibiotic is extracted with *n*-butanol and concentrated by steam distillation in vacuo. Pigmented impurities are removed by magnesium oxide and the active principle is precipitated by salicylic acid.

An increasing interest is being displayed in antibacterial substances which have been found to have anti-rickettsial or anti-viral action *in vitro* because of the possibility of controlling diseases due to these entities in man. These investigations have met with some measure of success particularly in the case of chloromycetin, which is produced by *Streptomyces venezuela*. This organism has been isolated from two widely distant sources—a mulched field in Venezuela and at the Illinois Agricultural Experimental Station (*J. Bact.*, 1948, *56*, 489).

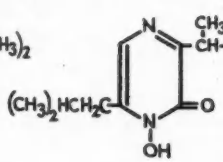
Chloromycetin is active against a wide range of gram-positive and gram-negative



I



II



III

The evidence in favour of structures II and III is also set out in some detail in *Chemistry and Industry*, 6.11.48, 717.

Among antibiotics produced by bacteria, bacitracin, produced by a gram-positive sporulating bacillus of the *Bacillus subtilis* group, is interesting. First isolated by

bacteria (*Science*, 1947, *106*, 417 and 418; *J. Amer. Med. Ass.*, 1948, 138 (6), 432; *J. Amer. Med. Ass.*, 1948, 138 (12), 908; *Proc. Soc. Exper. Biol. and Med.*, 1948, *68*, 9 and 12). More important, this antibiotic has been found to be effective in controlling scrub typhus to which so many

casualties were to be ascribed in the last war. It may be administered orally for the treatment of this disease and this is a great convenience.

Extensive trials of chloromycetin in scrub typhus have been made in Mexico, Bolivia, and Malaya in human material. Spectacular results were obtained at the Malaya Institute of Medical Research, Kuala Lumpur, when all scrub typhus patients treated with chloromycetin became afebrile in 30 hours as against an average of 18 days in the case of the controls.

Rickettsemia disappeared in 24 hours after the administration of the initial dose and the characteristic rash disappeared within 48 hours. The dose of the antibiotic is usually about 1 gram initially and, thereafter, 0.2 gram every four hours. There is rapid clearance of the drug from the system and about 10 per cent of that administered may be recovered from the urine. No toxic reactions have been noted (*J. Amer. Med. Ass.*, 1948, 138 (6), 432).

Both penicillin and *p*-aminobenzoic acid, in massive dosage, have been reported to be effective in cases of scrub typhus but treatment with these drugs is now likely to be superseded by chloromycetin.

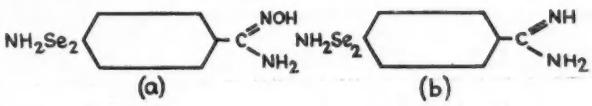
Aureomycin, another antibiotic produced by a member of the streptomyces group, *Streptomyces aureofaciens*, also appears to be effective against virus infections. It has been found to be particularly effective in lymphogranuloma venerum (a veneral disease caused by a virus) for which hitherto there has not been a drug available to modify the course of the disease except in respect of purely secondary infection (*J. Amer. Med. Ass.*, 1948, 138 (6), 408). Aureomycin may be administered by mouth and shows little signs of toxicity at effective levels in this disease.

Rocky Mountain fever is widely spread in the U.S.A. especially in Maryland, Virginia and N. Carolina though it rarely occurs in urban centres. The insect vector concerned is *Dermacenter variabilis* (the dog tick or *D. Andersonii* (usually in western districts). According to district the mortality is 15 to 37.5 per cent. Hitherto, treatment of the disease has been with a vaccine prepared from membranes of embryonated chicken eggs infected with *Rickettsia rickettsiae*.

After incubation, the membranes are suspended in saline, inactivated with formaldehyde, extracted with ether to remove lipids, etc., thus yielding an almost clear solution containing the immunising antigen, the protective action of which is immediate, although the duration of protection is as yet unknown. Cooke (*J. Amer. Med. Ass.*, 1948, *138*, (12), 885) has reported dramatic relief of symptoms in Rocky Mountain fever on administration of aureomycin which becomes a new and important therapeutic weapon.

Aureomycin has also been found effective against a range of micro-organisms and it is thought that it might prove useful in combatting penicillin and streptomycin resistant strains (*J. Amer. Med. Ass.*, 1948, *138* (13), 1946. *J. Bact.*, 1948, *56* (4), 489). Aureomycin is stable as a dry powder in sealed ampoules or in high concentration in distilled water at 4°C. or 37°C.; but it loses potency rapidly in low concentrations in broth, plasma or blood agar at 37°C.

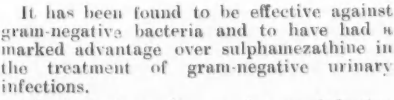
So far, no sulphonamide has been found effective in man against a virus infection although Andrewes *et al.* (*Proc. Roy. Soc., B.*, 1946, *133*, 20) found p-sulphonamidobenzamidoxime (a) and *p*-sulphonamidobenzamidine (b).



to be effective in experimental typhus in animals. Clinical trials with the drugs during the war, however, proved a disappointment.

Now, Sanders *et al.* (*Texas Reports on Biology and Medicine*, 1948, *3*, 385; through *Chemist and Druggist*, 11.12.48, 766) report that "N-(2-thiazolyl) phenol sulphonamide" has been found effective against a virulent strain of mouse poliomyelitis. It appears, also, to have been effective against a human strain poliomyelitis in monkeys, towards which animal the drug proved to have been remarkably non-toxic. Further reports on this sulphonamide will be awaited with interest.

A new sulphonamide, dimethyl-sulphonamidoisixazole (NU—445), developed in the U.S.A., has been introduced into medicine in this country during the past year by Ferguson *et al.* (*Lancet*, 1948, No. 6538, 969):—



It has been found to be effective against gram-negative bacteria and to have had a marked advantage over sulphamezathine in the treatment of gram-negative urinary infections.

Filariasis is a disease due to infection by a nematode worm of the genus *Filaria* or by the species *Wucheria bancroftii*.

These worms burrow into the skin and penetrate into deeper tissues. Many casualties, especially among native troops, were suffered from this cause during the late war.

The only satisfactory means of treatment so far has been surgical intervention. Local injections of antiseptics have proved ineffective and treatment with an intramuscular injection of the anthelmintic, phenothiazine, has had only limited success. A survey was completed in 1945 in the U.S.A. to screen likely drugs (Report on Medicinal Treatment of *F. bancroftii*, Nat. Res. Council, Washington, Sept., 45), and only organic antimony compounds seem to have been beneficial.

Pentavalent ethylstibanime was found most effective. The antimonials appear to act on adult filariæ and the circulating embryos (microfilariæ) gradually disappear from the blood stream.

The late Y. Subba Row and his co-workers have reported filaricidal action with "Hartrazan" which is 1-diethylcarbamyl-4-methylpiperazine hydrochloride.

Hewitt *et al.* reported successful clinical trials with this agent in 1947 (*J. Amer. Med. Ass.*, 1947, *135* (11), 708) and found that doses of from 0.5 to 2.0 mg. per kgm. bodyweight three times daily in hospitalised patients for from three to 22 days caused rapid disappearance of microfilariæ from the blood stream and there was some evidence that the drug had adverse action on the adult worm.

Hawking *et al.* (*Lancet*, 1948, No. 6532, 730) have explored the mode of action of hartrazan during the past year using cotton-rats infected with *Litomosoides carinii*. These workers confirm that this chemotherapeutic agent acts on the microfilariæ rather than on the adult worm; but the action on the microfilariæ appears not to be a direct one. The action of hartrazan on these embryos seems to have been similar to that of opsonins in the blood through the action of which the invading organism is so modified that they are capable of being dealt with by the body's normal defence mechanism, namely, seizure and engulfment by the phagocytes.

(Concluded)

Indian Metals

Development and Resources

A NEW sheet rolling plant of the Kaman's group of industries was recently inaugurated at Kurla, in the north of Bombay, by Dr. S. P. Mukherjee, Minister of Industry and Supply. The new equipment was expected to increase the capacity of the Kurla plant of brass and copper sheets up to 21 gauge, from 6000 to 10,000 tons annually.

Dr. Mukherjee said that the shortage of virgin metals in India had been the cause of some concern to the Government which, to encourage and promote industries, was negotiating with foreign countries for the supply of virgin metals and even imports from the dollar areas were being encouraged. The Government's recent announcement inviting the aid of foreign capital, the Minister said, did not imply that preferential treatment would be given to foreign, rather than local, capital.

* * *

A committee has been appointed by the Government of India to advise on the measures to be taken in regard to the conservation of metallurgical coal, with particular reference to recent reports received from the research institutions on coal-washing, coal-blending and other ancillary matters. Dr. M. S. Krishan, director of the Indian Bureau of Mines, will be the chairman.

British Help for Ceylon

Aluminium Foil Machinery and Experts

STATE approval for the establishment of an aluminium foil mill in Ceylon by British and local joint private enterprise, has been announced in Colombo by Mr. G. G. Ponnambalam, Minister of Industries and Industrial Research. The new enterprise, on which about Rs.1 million would be spent, will be State-controlled to the extent that the Government has stipulated that 51 per cent of the capital should be held in Ceylon. The balance will be British, chiefly in the shape of capital equipment and raw materials. Another stipulation is that important technical personnel should be under-studied by local people and that the labour employed should be indigenous.

Aluminium foil is used very largely by the tea industry and to a smaller but increasing extent, by the chocolate trade. The whole of Ceylon's requirements of aluminium foil for these purposes is imported. It is hoped when the mill is operating to export the product to the neighbouring countries.

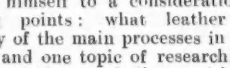
British interests had approached him, said the Minister, and he had authorised them to establish the plant. The machinery had already been shipped to Ceylon and the technical personnel would be arriving in the Island about September. Production will begin early next year.

THE CHEMIST'S VIEW OF LEATHER

Scientific Background to a Traditional Industry

DR. M. P. BALFE, of the British Leather Manufacturers' Research Association, giving the final lecture of the current session to the London section of the Society of Chemical Industry last week, confined himself to a consideration of the following points: what leather is; the chemistry of the main processes in its manufacture; and one topic of research.

Hides or skins are built up of interwoven fibres of collagen and the chemical structure of such fibres may be represented by a polypeptide chain thus



the fundamental repeating unit being enclosed in a bracket. It is known that of every six side chains (shown by R in the formula) three are inert, one has an OH group, one a COO^- group and one an NH_2 group. These functional side chains are intimately connected with the process of tanning, *e.g.*, the fixation of the tanning agent with the protein and cause the osmotic effect of leather in acid or alkaline solution.

Physical Properties

Most of the properties which make leather so useful are physical properties such as resistance to abrasion, to water penetration and its flexibility, plasticity, colour, etc. Such properties are governed by the nature of the fibre and the interweaving, especially the angle at which the fibres run between the flesh and the grain surfaces.

Each kind of skin has a characteristic structure which will, in part, determine its use, and the skin from one animal will vary in texture according to the part of the body from which it is removed. These "selection features" are more fundamental than any characteristic a tanner can impart, but the two factors taken together give a large range of types.

In the conversion of skin to leather there are four criteria to be considered which, although not necessarily of practical importance, help in understanding the changes which occur. These are: (1) chemical stability; (2) resistance to enzymes; (3) shrinkage temperature in water; the polypeptide chains in a protein are arranged in an orderly manner for most of their length and cross linking, *e.g.*, by hydrogen bonds, helps to maintain this regularity. Heating in water weakens the cross links and the chains become random and linked with the consequent shrinkage of the leather. This occurs at a sharply defined temperature and varies from 60°C. for untanned leather to about 100°C. for tanned. (4) Retention of fibrous structure on drying. When a skin is dried the capillaries collapse and the skin appears glossy rather than fibrous.

Capillaries of Skins

This may be avoided by means such as replacing the water by a water miscible non-volatile liquid, *e.g.*, glycerol, by replacing the water with a low surface tension liquid which will easily evaporate without drawing the walls of the capillaries together (acetone), or by coating the walls of the capillaries with a film of oil. The table below gives some indication of the alteration in properties of a skin brought about by various methods of tanning.

Method of tanning	Shrinkage °C.	Resistance to Proteolytic enzymes
None	58-68	+
Oil	50-65	++
Quinone	63-73	++
Vegetable tannin ...	70-87	+++
Basic aluminium ...	74-81	
Basic chromium ...	77-100	++++ (complete)

Dr. Balfe went on to discuss the main processes by which a skin may be converted to leather.

For the purpose of the lecture, only those tanning processes which raise the shrinkage temperature were considered—vegetable tanning, use of metal salts and formaldehyde.

Vegetable tannins contain many hydroxyl groups and it seems certain that the process involves hydrogen bond formation between the hydroxyl groups and the protein. The ratio of tannin to collagen is about 100 parts of tannin to 100 parts of collagen but may vary from 75-150. The fact that capillaries are largely filled by the tannin helps to explain the source of fullness and preservation of the structure.

Metallic Salts

The most common metal salts are basic chromium salts but in this case there are only 10 parts of salt to 100 parts of collagen, so that when the water evaporates the capillaries will collapse unless steps are taken to prevent this, *e.g.*, by oiling. In the case of formaldehyde the primary reaction is with the basic side chains of the protein giving $—NH—CH_2OH$ which may

(*Continued at foot of next page*)

Improved Soap Manufacture

Reduction in Production Time

A CONSIDERABLE reduction in the time required for production of uniform neat soap and the like, is described in an English patent application, open to public inspection, by Lever Bros. and Unilever, Ltd.

In conventional soap-making, during each change the mass is boiled by open steam through coils at the bottom of the pan, causing the soap mass to swell and the intimate mixing of soap and lye solution. At the end of each change the steam is shut off and the mass allowed to settle. Grain soap curd rises to the top, and the lye forms underneath and is withdrawn. In the finishing operation by boiling with water and small amounts of lye the neat soap is made to rise to top and nigre settles underneath. This takes up to 60 hours and is subject to other inconveniences.

It has now been found possible to condition a batch of kettle soap from one of the preliminary charges—prior to finishing—and then treating the conditioned soap so that nigre or lye can be separated rapidly, by centrifuging, from the neat soap. Such conditioning is effected by reducing the total fatty acid content to such extent (say, 50-60 per cent of the total weight of the composition), by addition of electrolyte, namely a salt solution, that, on stirring, the soap mass remains in a homogeneous condition. Stirring is continued, together with withdrawing, in continuous stream of conditioned soap from the mass; intimately mixing and stirring in electrolyte also in continuous stream, and so proportioned as to form a neat soap phase kept at a temperature of 180° F. or over (up to 200° F.), and centrifuging the soap-electrolyte mixture to separate out the neat soap. Further electrolyte is added to reduce f.a. (fatty acid) between 45 and 55 per cent. In this way a pan of soap may be finished and settled in a battery of centrifuges at the rate of about 2500 lb. neat soap (63 per cent. f.a.) per hour per centrifuge.

By maintaining the bowl adjustment of the centrifuge constant and changing the electrolyte content, the proportions of soap removed from the mass in the heavy effluent may be varied from only a trace of f.a. to amounts up to and sometimes exceeding 35 per cent of total f.a. This ratio, of electrolyte to soap, will determine the constitution of the heavy effluent; and it will be nigre or lye according as electrolyte proportion is low or high.

(*Patent application No.* 23810/1948; *convention date* 16.9.47.)

THE CHEMIST'S VIEW OF LEATHER

(*Continued from previous page*)

react by hydrogen bond formation or with another —NH group.

Nearly all tanned skins require an oil treatment before drying and two of the main physical properties of such oil are its viscosity and its interfacial tension. The former is important because of its effect on diffusion into the capillaries; the latter because the leather is treated wet, hence an oil with a low oil/water interfacial tension is required. The traditional oil used in the leather industry is Newfoundland cod but in time of shortage a mineral oil can be used in conjunction with an auxiliary to lower the interfacial tension.

PROPERTIES OF LEATHER OILS

	Relative Viscosity Water=1	Interfacial Tension dyne/cm.
Newfoundland cod	70-80	10-11
Neatsfoot	110-115	15-23
Castor	1050-1100	21-25
Mineral	45-120	29-51

The topic of research dealt with by the speaker was one which has been current for many years and concerns the swelling of protein fibres in water and, in particular, in acid solutions. If a protein be represented as P$\begin{cases} NH_3^+ \\ COO^- \end{cases}$ then the addition of HCl will convert this into P$\begin{cases} NH_3^+ \\ COOH \end{cases}$ .Cl'. The latter compound is a non-diffusible ion and will cause water to be drawn into the fibres giving what is sometimes called the osmotic effect.

The diffusion of water into the fibre will cause swelling and when collagen fibres swell they become shorter and fatter. This has the effect of altering the angle between the flesh and grain surfaces, *i.e.*, the angle of fibre weave becomes high.

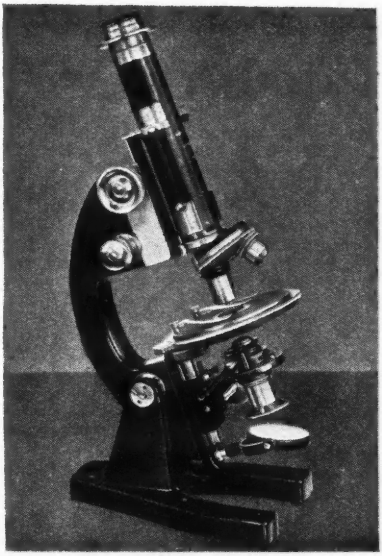
Varying this angle affects the physical properties of the leather and consequently the swelling procedure is controlled to give the desired angle of fibre weave. This may be done by altering the *p*H of the solution in which swelling occurs and by the addition of mineral salts. It must also be borne in mind that the amount of swelling will influence the adsorption of the tanning agent—if the capillary becomes narrower less will be taken up.

CONTEMPORARY MICROSCOPES

Adapting Designs to the Analyst's Needs

ONE of the classical instruments of analytical chemistry is the microscope. The curious fact about this is that its recognition as such is too rare, even among microscope manufacturers. The usual types of microscope for which the analytical chemist may find a use are the relatively low-power binocular stereoscopic microscope, more rarely a metallurgical or similar microscope for examination by reflected light, and most important of all, the general purpose petrographic microscope, with a reasonably comprehensive range of fittings including mechanical and rotating stage, sub-stage polariser and condensing system, body-tube analyser and perhaps Bertrand lens.

Few British manufacturers at present produce an instrument of this last type, and those that are in production are not novel. It is worth bearing in hind, however, that ordinary compound microscopes can now be fitted with Polarised discs to serve as polariser and analyser, thus enabling them to be used fairly successfully for some problems where a petrological microscope would normally be applied, and so extend their range of usefulness considerably.



Mineralogical microscope with a rotating-mechanical stage, polariser, body-tube analyser and Bertrand lens (James Swift and Son, Ltd.)

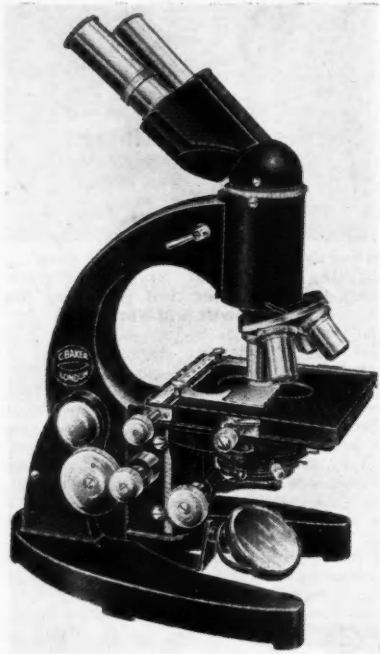
The successful application of new design and computations is reflected in several obvious features of this new monocular microscope, the 4BQ Drawtube (C. Baker of Holborn, Ltd.)

Very attractive is the range of compound microscopes, made to several specifications, in which all adjustments are placed at or below stage level, and are well grouped for use. Monocular and binocular instruments of this type are illustrated. The impressive balance in design, as well as the functional aspect, have been successfully studied.

Also among those illustrated is the Model 4AQ/Inc.Bitu microscope by C. Baker of Holborn, Ltd., and their 4BQ/drawtube, which were prominent among this firm's exhibits at the BIF. The former is an inclined binocular tube in which inter-ocular adjustment is effected by the rotation of the two eyepiece tubes through a limited arc about a common axis in the manner of a pair of field glasses, giving an inter-ocular range of between 50 and 75 mm.

This form of binocular eyepiece tube has certain advantages over the parallel sliding type, in that it is less liable to lose its adjustment, and this form can be made much lighter and neater than the other. The binocular tube attachment contains a lense compensating for tube lengths and magnifies the image 1.25 times.

Included in the composite exhibit at the BIF of the Scientific Instrument Manufacturers' Association of Great Britain, Ltd., was a prototype of a microscope exhibited by C. Baker of Holborn, Ltd., at the First International Exhibition of 1851, in Hyde Park, London, also the portable diagnostic microscope which this firm made and designed specially for the late Sir Ronald Ross, with which he, in 1897, discovered the parasite responsible for malaria. Alongside these two historic instruments were shown the latest types of microscopes embodying the most modern improvements.



The latest modifications in the binocular form of microscope have been incorporated in the 4AQ inc. Bitu, which provides for fine inter-ocular adjustment and is fitted with convergent tubes to permit normal ocular focus (C. Baker of Holborn, Ltd.)

Among other optical instruments to be seen in the SIMA exhibit at the BIF was a new type of universal microscope hitherto not made in this country, covering photomicrography, bacteriology, metallurgy, etc. An interesting exhibit was the binocular microscope for the fenestration surgical operation on the ear. This instrument is used to enable all particles of bone dust to be seen, also it permits of the finishing off of the new opening in such a way that the growth of fresh bone is as far as possible obviated. The structures involved in this operation are extremely small and cannot be viewed satisfactorily by the surgeon except under a comparatively high magnification.

Instrument Craftsmanship

Fine Pieces of Four Centuries

LONDONERS and visitors to the capital during the past few weeks have had an unusual opportunity of seeing some of the outstanding examples of craftsmanship in scientific instruments from the 17th century to the present day, gathered under one roof at the Science Museum, South Kensington. Three collections have been on view.

In the optical section, the latest gift from M. Thomas H. Court of 27 early microscopes and other instruments includes a most interesting piece (*c.* 1675) bearing on its elegant red leather covering a stamping which identifies it as having been made by Christopher Cock. Cock was the instrument maker known to have worked for Robert Hooke (1635-1703), secretary of the Royal Society, and was one of the most distinguished microscopists of the 17th century.

Another excellent specimen is a microscope signed *J. Mann fecit*, which dates from about 1695, and is believed to be the only existing example of an English 17th century microscope signed by the maker.

A general impression of scientific study during the second half of the 18th century is given by the collection of models made for the instruction of King George III when he was Prince of Wales. The collection has been in store since 1928, but is now on view again for a few months, and comprises instruments connected with astronomy, mathematics, mechanics and optics.

Examples of fine workmanship of the rising generation of the present time formed the Physical Society's exhibition of winning entries in its craftsmanship and draughtsmanship competition, 1949. This gave encouraging proof that faultless workmanship was still to be found. There were a number of prizes and special awards.

FULL UTILISATION OF FUEL

"Britain's Technical Knowledge Second to None"

"IN my opinion there is no industrial establishment which, if it tackled the job thoroughly, could not carry out its operations, whatever they may be, with a substantially reduced consumption of fuel with great resulting advantage to itself and to the country's general economic position," said Mr. Robert Foot, chairman of Powell Duffryn Technical Services, Ltd., in an address this week to the Fuel Luncheon Club.

His company's work in connection with the development and proper utilisation of the coal resources of the Dominions and Colonies, had, within the last two years, taken him personally to Australia, South Africa and Nigeria.

"During the course of our work," he said, "we have dealt with coal in great variety and of the widest possible range of characteristics and quality, and have covered, in our advice to our clients, every phase of the problem of coal. This includes not only its efficient use directly as a fuel and the technique and economics of its chemical derivatives, but also its use as a raw material for the production of petrol and diesel oil by the latest methods.

Coal Resources

"That we have so quickly become so busily engaged in this way all over the world is striking proof of the fact that Governments have at last realised that the possession of indigenous coal resources should be counted as one of their most precious possessions in the interests of their country's economic prosperity and political and industrial independence, and that if the chemist, the physicist and the chemical engineer are allowed to take their full share in the proper assessment and development of the deposits, coals which have hitherto been classed as inferior and considered of little use can be given a value which has never before been appreciated."

Mr. Robert Foot said the closest estimate he had been able to obtain of the total cost (without transport and distribution charges) of industrial coal supplied in the U.K. in 1948 was £342 million. The tonnage he had taken in arriving at this estimate excluded colliery consumption and miners' coal and, of course, all house coal.

If the 1948 tonnage had been purchased at 1938 prices the total cost would have been £125 million. The difference between these two totals was £217 million. Judged by any standards this was a tremendous additional burden of costs which the industrial consumer had to bear, and it should be noted also that if the increased costs of transport and distribution was added to the total, and the lower average calorific value of the coal was also taken into account, the burden became greater still.

"So far as concerns coal," continued Mr. Robert Foot, "the only indication as to the future trend of prices has come from Sir Charles Reid and his son, Dr. William Reid, who in a recent address to the Royal Society of Arts (THE CHEMICAL AGE, *60*, 439) expressed the view that if mining wages are kept at their present level, increased productivity through mechanisation can do no more than bring down the cost of production of coal by 5s. a ton by 1965. If this gloomy forecast proves to be anything like accurate it emphasises all the more the matters which I am putting before you.

Fuel Costs

"In the case of many commodities in general use at home of forming important exports abroad, fuel has almost for the first time become an item of serious importance in the build-up of the total cost of the product, and in everything we are producing to-day fuel costs loom sufficiently large in the profit and loss account to justify—indeed to demand—that the boards of directors everywhere keep the matter continually before them.

There are, I suggest, three simple alternatives facing boards of directors throughout the country, and not only the boards of privately owned industries, but also the boards of nationalised industries in their own vast consumption of fuel, and local authorities throughout the country, and finally the Government itself through its great fuel-using departments, the service departments, the Ministry of Works, the Ministry of Supply, and the Ministry of Health, to quote only some.

Economy in Use

"The alternatives are, that they will do nothing about it but simply sit back and wait for the price of coal to be brought down again to a figure where it no longer looms largely in their cost sheets; and that, although approaching the matter with every desire to help, they still take no positive action because they feel that there is no further scope for greater economy or efficiency in the use of fuel in the industrial or other operations for which they are responsible. Any serious suggestion that this alternative is valid is completely negatived by the established facts.

(*Continued overleaf*)

"There is, of course, all the evidence forthcoming from the results of the successful operations of the Fuel Efficiency Committees during the recent war under the able direction of the Ministry of Fuel and Power. These resulted in an acknowledged saving of the order of 10 million tons of coal a year, without the expenditure on new capital equipment to any important extent.

Estimated Saving

"The last authority I will quote in support of the general statement that there are great savings to be effected in the fuel consumption for all purposes in the industrial field is the second Interim Report of the Coal Utilisation Sub-Committee of the Parliamentary and Scientific Committee. This report, which was published on December 18, 1947, after obtaining views of some of the leading fuel technologists in the country, estimates that it is possible to save 18 million tons of coal a year simply by replacing inefficient industrial coal-burning equipment with modern plant incorporating well-established technical improvements.

"I would just like to add that while in the opinion of the Parliamentary and Scientific Committee this saving could not be achieved without the installation of new equipment and plant of a capital nature, there are still savings to be achieved throughout industry by the more efficient operation of existing fuel plants without any substantial capital expenditure at all.

"I have no doubt whatever that in our technical knowledge on the proper utilisation of fuel Britain takes second place to no other country in the world—indeed I do not think it would be an exaggeration on my part to claim that in this particular field we are in the lead. I am glad to say that this was the opinion expressed at the World Power Conference at The Hague in 1947.

Personal Enterprise

"What help from outside his own resources and decisions does the large consumer of fuel need to enable him to get the harvest? This whole question is primarily and almost entirely a matter for his own energy and enterprise. The Government can help by giving a first priority to raw materials, particularly iron and steel, for new fuel-burning equipment and by easing the burden of taxation for such equipment.

"In this connection the present Finance Bill, in raising the initial allowance on plant and machinery from 20 per cent to 40 per cent is an important step in the right direction. At the same time, I cannot help feeling that if the figures I have quoted are given their full significance, it may well seem wise by further taxation relief to give a special inducement to industrialists to embark upon capital expenditure leading directly to a saving of fuel.

"The fuel technologist is waiting to help and has all the knowledge necessary to enable him to do so. But first and finally the solution of this problem rests with the industrial consumer, whether he be a private concern or a national or municipal body. It is only he who can take the initiative, and if he does so I am convinced that he is not only serving the interests of his industry but fulfilling a national duty at the same time."

Trapping Carbon Monoxide

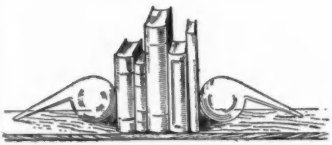
Canadian Claims for Silver Permanganate

THE prospect of a further aid in minimising of hazards associated with carbon monoxide is held out by a formulation employing silver permanganate as the active agent. Some details about this Canadian development were given at a recent meeting of the American Chemical Society by Dr. Morris Katz, of the Defence Research Board, Canadian Department of National Defence. He claimed that carbon monoxide poisoning, a menace in mines, garages, and tunnels, and some chemical plants, could be prevented by a new powder, which was highly effective and notably long-lived in the temperature and humidity ranges generally encountered in the temperate and tropical climates.

Many respirators have hitherto depended largely upon a mineral substance known as hopcalite to absorb carbon monoxide and convert it to relatively harmless carbon dioxide. Hopcalite, though active, is prone to attack by moisture in the air and often loses its potency.

In addition to serving as the filling in gas mask canisters, the new silver permanganate powder could be placed in ventilating systems to clean large volumes of air. The metal salt, it was explained, is employed as a coating on granules of various metallic oxides, clay, talc, or purified asbestos fibres. Highly convoluted granules, exposing relatively large surface areas, are the most active.

Silver permanganate can also be used to detect and measure extremely small amounts of carbon monoxide in the air, and is said to be especially effective when the concentration of the toxic gas is extremely low.



A CHEMIST'S BOOKSHELF

British Chemical Nomenclature. A. D. Mitchell, D.Sc., F.R.I.C. 1949. London: Edward Arnold & Co. Pp. 156. 21s.

The author of this book has been assisting in the editing of the *Journal* of the Chemical Society for over 20 years and during this time he has prepared for the press all the inorganic papers and over 2000 organic ones. Dr. Mitchell therefore brings to this task a wealth of experience; that fact is obvious from even the most casual reading. The least ambiguous method of describing a compound is by means of a graphic formula, but such formulae cannot be indexed and for this purpose a compound must be named. (This difficulty may be overcome by a cipher system such as that of Dr. G. M. Dyson's but until such methods find universal acceptance the more conventional methods must remain).

Within the last two decades there has been published an enormous volume of work dealing with a variety of natural products and in many cases each principal worker has developed his own system of nomenclature for his particular field. In view of the difficulty of naming complex molecules in a systematic way there have arisen a large number of "trivial," *i.e.*, non-systematic, names and, although these may be useful to workers cognisant with the particular field, they are of little use to others, giving no indication of the chemical structure of the compound. A case in point is the synthetic drug "cardiazole" which is not a diazole but takes its name from its use in cardiac troubles.

The present volume is primarily a statement of the existing position, rather than a crusade for its reform. As the title implies, the emphasis is on British methods, but where these are different from current practice in the U.S.A. attention is drawn to this and the merits of the various methods are discussed. Of the book's three parts, the first deals with such aspects as the use of Greek and Latin numerical prefixes, the use of "bi-" as a prefix and the use of italic type. The other two parts deal respectively with inorganic and organic nomenclature.

The contents of the inorganic section may be summarised by saying that the nomenclature of elements, covering isotopes and allotropic forms, is dealt with first, then compounds between two elements, between three or more elements, passing to isopoly and heteropoly-acids and their salts and then to nitrogen compounds. The section is concluded by three chapters on the hydrides of boron and related compounds, carbonyl compounds and organometallic compounds.

In the organic section the author's task is complicated by a wealth of material and this section occupies the major part of the book. The arrangement is such that acyclic hydrocarbons are first considered and then functional substituents of one type followed by those of multiple functions. What might be described as the fundamentals of organic chemical nomenclature are contained in these first chapters and they could well be studied with profit by those who write chemical papers and books. Not the least useful fact in these chapters is a clear statement as to the order in which substituents should be taken when naming a compound. In view of their specialised nomenclature carbohydrates and their derivatives are considered in a separate chapter before passing to cyclic systems. Following a discussion on derivatives of the latter, including the indication of the stereochemical configuration of steroids, a selection of ring systems is discussed in detail. The organic section concludes with a list of some common radicals and a classification of the trivial and systematic names of various groups of compounds such as purines, carboxylic acids, amino-acids and carbohydrates.

In this book Dr. Mitchell has succeeded in setting out most clearly the present system of chemical nomenclature and also in pointing out anomalies and inconsistencies, often with an explanation as to how they arose. These statements should enable the chemist to decide between the conflicting nomenclature to be found in journals and textbooks. Chemical nomenclature has roots so deep that a complete systematisation would probably make confusion more confounded.

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Personal

AT board meetings in London last week COMMANDER COLIN BUIST was appointed chairman and managing director of Coalite & Chemical Products, Ltd., in succession to the late COL. WHISTON A. BRISTOW. LORD HAZLERIGG OF NOSELEY accepted the office of deputy chairman. Commander Buist was also appointed chairman of the three subsidiary companies, the British Diesel Oil & Petrol Co., Ltd., Doncaster Coalite, Ltd., and the Derbyshire Coalite Co., Ltd. He joined the board of Low Temperature Carbonisation, Ltd., as the organisation was then known, in 1929 and has always taken an active part in the development and the extension of the Coalite process and its ancillary interests. He has been closely associated with the low temperature carbonisation industry for nearly 20 years. MR. J. P. POSTLETHWAITE, M.C., and MR. F. L. WARING, were elected to the boards of the three subsidiary companies as joint managing directors.

MR. VICTOR D. WARREN, assistant regional manager for Scotland and Northern Ireland of I.C.I., Ltd., whose election as Lord Provost of Glasgow was recorded last week, had a narrow escape from drowning while fishing on May 13 on Loch Arkaig. The chaffeur who accompanied him and a friend fell from the boat and was drowned and Mr. Warren nearly lost his life in a desperate attempt to get him to the shore followed by the successful rescue of the other member of the party, clinging to the upturned boat.

MR. G. B. JONES, the general works manager of Imperial Chemical Industries, Dyestuffs Division, Dalton Works, Huddersfield, was successful as Liberal candidate of the Lindley Ward in the Huddersfield municipal election last week. He had a majority over his Labour opponent of 1106 votes.

PROF. M. L. E. OLIPHANT, the atomic research scientist, is to resign as vice-principal of Birmingham University from September 30, because, it is stated, of "pressure of his departmental responsibilities."

MR. WILLIAM ALEXANDER KINNEAR, a director of Evans Medical Supplies, Ltd., was the successful Conservative candidate in a three-cornered contest in the Aigburth Ward in the Liverpool municipal elections.

MR. KENNETH HALL, managing director of the Northern Aluminium Co., Ltd., is the new president of the Council of the Aluminium Development Association.

Atomic Research in Australia

FURTHER speculation on the uses of Australia for the establishment of an atomic research centre have been aroused by a report from the Australian News and Information Bureau, New York, which foresees that the possible manufacture of atomic weapons in the Commonwealth is expected to follow the arrival of Britain's chief scientist in this field, Prof. M. L. E. Oliphant, when he transfers to the University of Canberra in 1951.

The professor will be accompanied to Australia by several key members of his staff, including Mr. S. R. Cornick and Mr. M. P. Edwards, two British atomic scientists, who will be his chief assistants; Dr. J. Gooden, Mr. Hubbard and Mr. J. Symons, three Australian scientists now at Birmingham, and two other scientists to be appointed to his staff.

ROYAL SOCIETY: HONOURS MEMBERS

AT a meeting of the Royal Society last week the following were elected Foreign Members of the society:—

PROF. PERCY WILLIAMS BRIDGMAN, research professor of physics at Harvard University, who is distinguished for his pioneering work in the field of very high pressures and for his contributions to theoretical dynamics and mathematical logic.

PROF. NORMAN LEVI BOWEN, petrologist at the Geophysical Laboratory, Carnegie Institution, Washington, distinguished for his quantitative experimental researches in petrology and his fundamental contributions on the origin of igneous rocks.

PROF. MAX VON LAUE, of the Max Planck Institute, Göttingen, Germany, distinguished for his work on wave properties of X-rays and their application to the study of matter in the crystalline and other states.

PROF. ERWIN SCHRODINGER, senior professor and director of the department of theoretical physics, Dublin Institute of Advanced Studies, Dublin, distinguished for his contributions to quantum mechanics.

Deficient Lime. — Calcium deficiencies ranging from 12.8 per cent to 33.22 per cent in recent samples of lime were reported by Mr. W. A. Bertram, Inspector of Weights and Measures to Angus County Council, when he contended that there were too many loopholes under the Merchandise Marks Act to permit prosecution. A copy of his report is to be forwarded to the Department of Agriculture in Scotland and to the NFU.

American Chemical Notebook

(From Our New York Correspondent)

PARA amino salicylic acid, commonly known as PAS, which in combination with other drugs has shown promise as a cure for some types of tuberculosis is now available to the pharmaceutical industries in commercial quantities, the Monsanto Chemical Company, St. Louis, Missouri, announces. Results of experiments conducted chiefly in Europe have been encouraging although the number of clinical tests is not yet sufficient to permit positive conclusions. PAS has been tested on both animals and humans, according to Monsanto, but seems most effective with streptomycin. With larger amounts of PAS available it will be possible for pharmacologists and workers in clinics to investigate its action further, particularly in conjunction with other drugs, such as streptomycin and dihydrostreptomycin.

* * *

At the conclusion of a Health Service conference which took place this week in Washington, D.C., Dr. Leonard A. Scheele, Surgeon General of the U.S. Public Health Service, announced that the three large manufacturers of fluorescent lights in the United States, the General Electric, Westinghouse, and Sylvania companies, have agreed to discontinue the use of beryllium phosphor after June 30 in the manufacture of fluorescent bulbs. This follows the framing of a set of precautions for disposal of burnt-out fluorescent lamp tubes (THE CHEMICAL AGE, *60*, 594) by 18 representatives of industry, education and government groups at the request of the Department of Health and Sanitation.

* * *

Plans for the construction in Philadelphia, Pa., of a $2 million research laboratory are disclosed by the Du Pont company. Building is scheduled to begin shortly and to be completed in 1950. The laboratory is part of the company's scheme to expand and improve facilities for research and development in the field of paints, varnishes, enamels, synthetic resins, and other finishing materials. Users of Du Pont finishes who wish to solve actual production problems or try new finishing recommendations will also benefit from the laboratory.

* * *

Visits to the United States by six groups of Norwegian technicians to study American methods of mining, manganese production, steel making and pulp and paper production have been approved by the Economic Co-operation Administration, bringing to a total of nine the number of studies arranged for Norwegian experts under ECA's programme for providing technical assistance to Marshall Plan countries. The mining project, which involves assistance in the Norwegian Government's efforts to rehabilitate war-destroyed mines in Northern Norway, will bring six technicians from the Sydvaranger A/S Iron Mines for a two to six months' study of U.S. methods. Two metallurgical engineers will comprise a team studying processes involved in the production of ferro-alloys. Studies of America's electrolytic method of producing manganese metal will be made by Torgeir Hoverstad, plant manager of the Norwegian company, Porsgrunds Elektrometallurgisk.

The fourth project provides for visits by three engineers to steel plants in the United States for study in connection with the design and erection of the Norwegian Government's steel works at Mo-i-Rana.

* * *

Development of a series of new chlorinated hydrocarbons, whose properties suggest their use in many industrial applications, has been announced by the Pennsylvania Salt Manufacturing Company, Philadelphia, Pa. Among the expected industrial applications are: as a plasticiser; as a flame retardant in the manufacture of adhesives; and in other formulations for the impregnation or coating of wood products, textiles and paper. While further possible applications are being investigated by the company, samples and literature are being made available to the trade, free of charge, upon written request to the company's Market Research Department, Widener Building, Philadelphia 7, Pa.

* * *

Poison ivy plants have met their match in a new Monsanto chemical compound weed killer named 2,4,5-trichlorophenoxyacetic acid, a cousin of 2,4-D, called 2,4,5-T for convenience. While 2,4,5-T kills many of the same weeds as its better known cousin, Monsanto reports that early tests indicate that it is especially effective against brambles, brush and tree stumps which resist 2,4-D. A hormone type chemical, 2,4,5-T seems to affect plant respiratory action, and causes plants to become contorted and die. To kill poison ivy the bark and leaves of the plant are thoroughly sprayed with a solution of the new chemical.

Conserving World Resources

SOME of the diverse papers being contributed by scientists of many countries to the United Nations Scientific Conference on Conservation and Utilisation of Resources, and published by the conference secretariat in New York, have now been received by the Overseas Liaison Division of the Department of Scientific and Industrial Research.

The conference, at which some 750 experts will attend (THE CHEMICAL AGE, *60*, 413), meets at Lake Success from August 17 to September 6.

Among the papers now available for inspection are the following:—

Contributed by the United Kingdom.—Mineral resources: "Iron and Steel Making from Low-grade Ores," A. Robinson, Appleby-Frodingham Steel Co., Ltd.; "Blast Furnace Acid Burdening Practice," Staff of Stewarts & Lloyds, Ltd.; "A Note on the Use of Gaseous Oxygen," D. J. O. Brandt, British Iron & Steel Research Association; "The Supply and Industrial Applications of Scrap Metals," H. J. Miller, British Insulated Callender's Cables, Ltd. "Magnesia and Magnesium from Sea Water," Major P. Litherland Teed, Vickers-Armstrongs, Ltd.; "Petroleum Refining in the United Kingdom," F. Mackey, Shell Refinery & Marketing Co., Ltd. Marine Resources: "The Utilisation of Marine Algæ," Major Philip Jackson, deputy director of the Scottish Seaweed Research Association.

Contributed by Other Countries.—Mineral Resources: "Synthetic Fuel Production," W. C. Schroeder, Washington, D.C. Water: "Control and Utilisation of Polluted Waters," Ernest W. Steel, Venezuela, S.A. Forests: "Treatment of Trees with Toxic Chemicals to Facilitate Removal of Bark and to Reduce Weight," J. D. Hale and D. C. McIntosh, Ottawa, Canada.

Research Laboratory Visits

The Chemical Research Laboratory (DSIR), at Teddington, Middlesex, announces that its series of "open days" this year will comprise three sessions, on June 30 (afternoon), and on July 1 (morning and afternoon). The director will be glad to receive applications from industrial firms wishing to send representatives until June 20. It is not necessary for those already on the invitation list to re-apply.

The five main branches of research are: Corrosion of metals; organic chemistry; inorganic chemistry; radiochemistry; and high polymers and plastics.

Institution of Electronics

The fourth annual Electronics Exhibition organised by the north-west section of the Institution of Electronics will be held at the College of Technology, Manchester, during the three days, July 19 to 21. Admission to the exhibition is by ticket—from Dr. J. A. Darbyshire, "Melandra," 1 Kershaw Road, Failsworth, Manchester.

Next Week's Events

MONDAY, MAY 23

Leicester and Leicestershire Industries Exhibition. Leicester: Granby Halls, daily 11 a.m. to 9 p.m. (until Saturday, May 28).

Paris International Trade Fair. Porte de Versailles (until June 6).

TUESDAY, MAY 24

Textile Institute. Dublin: Annual conference: "The Industrial Application of New Knowledge" (until Friday, May 27, inclusive).

WEDNESDAY, MAY 25

Royal Statistical Society (North Eastern Group). Newcastle-on-Tyne: Newcastle Chemical Industries Club, 6.30 p.m. A. W. Swan: "The Organisation and Operation of a Statistical Section in a Heavy Industry."

Royal Institution. London: Burlington House, Piccadilly, W.1, 9 p.m. Prof. A. H. Cook: "Chromatographic Separation of Natural Compounds."

The Institute of Metals. London: Royal Geographical Society, Kensington Gore, 6 p.m. Annual May meeting. Sir Edward Appleton: "The Organisation and Work of the Department of Scientific and Industrial Research."

Society of Chemical Industry (Chemical Engineering Group). London: Waldorf Hotel, Aldwych, W.C., 6.15 p.m. 30th annual general meeting, 7.30 p.m. Annual dinner. (Food Group). Brighton: Astoria cinema, Gloucester Place, 10 a.m. Joint meeting with the Royal Sanitary Institute. Discussion: "The Care and Preservation of Fish as Food." Opening address by Dr. E. B. Hughes, chairman of the Food Group.

North Western Fuel Luncheon Club. Manchester: Engineers' Club, Albert Square, 12 noon. Dr. D. M. Smith: "Gas Turbines."

THURSDAY, MAY 26

Institution of Electronics. Manchester: Reynolds Hall, College of Technology, 6.30 p.m. Dr. A. C. B. Lovell: "Radio Astronomy."

The Chemical Society. London: Burlington House, Piccadilly, W.1, 7.15 p.m. Reading of original papers. R. E. Deriaz, W. G. Overend, M. Stacey, J. Stanek, (Miss) E. G. Teece, and L. F. Wiggins: "Deoxy Sugars, Parts V, VI, and VII;" F. Rothstein and R. W. Saville: "The Reaction Between Aromatic Compounds and Derivatives of *Tert-acids*, Parts I to V."

Home News Items

Oil Plant From Wales?—A party from the Industrial Association of Wales and Monmouthshire last week visited the Stanlow refinery of the Shell Refining and Marketing Company at Ellesmere port to examine the equipment and explore the possibility of such plant being manufactured in Wales.

Exports Drop.—Provisional estimates of United Kingdom export trade in April place the total at £137.4 million, £22.5 million less than the record sum produced in March. Exports of chemicals, drugs, dyes and colours in the first quarter of this year were valued at £7.51 million, £370,000 more than in the last quarter of 1948.

Radioactive Rubbish.—To safeguard them and others against the effects of radioactive dust, cleaners at the new Ministry of Supply radiochemical centre at Amersham are to be given a course of lectures and demonstrations in methods of recognising radioactive particles and how to safeguard themselves against contamination. Special rubber protective clothing is to be worn at work.

Big Penicillin Order for I.C.I.—The United Nations International Children's Emergency Fund is reported to have signed a contract with Imperial Chemical Industries, Ltd., Manchester, for the supply of 50,000 vials, each containing 3 million units of procaine penicillin, to be used for combating syphilis. The total programme of UNICEF, as at present planned, will require about 200,000 vials.

Government Sale Offer.—The Board of Trade has notified its intention to sell 748 fully paid £1 shares, now held by the Custodian of Enemy Property, in W. Busching Chemical Engineering Co., Ltd., 78 Queen Victoria Street, London, E.C.4. Full particulars of the offer are being supplied by the Administration of Enemy Property Department (Treasury and Board of Trade), 32 Warwick Street, Regent Street, London, W.1.

Paint Works Fire.—Fire in the paint works of David T. Morrison & Co., Ltd., at 28 Dobbie's Loan, Glasgow, followed the bursting of a boiler recently. An entire wing of the factory was involved but firemen quickly succeeded in restricting the blaze to one section of the building. There were no casualties among the employees, and work was maintained by a skeleton staff, the principal operation having been previously transferred to new premises on the Hillington Industrial Estate, near Glasgow.

KID Exemption.—The Treasury has made an order under Section 10 of the Finance Act, 1926, exempting formic acid (not less than 98 per cent), maleic acid, paraphenetidine, meta-aminophenyl and isopropyl hydrogen phosphate from Key Industry Duty from May 12 until June 30, 1949.

World Power Conference. — Princess Elizabeth and the Duke of Edinburgh are to give their patronage to the Fourth World Power Conference, to be held in London at the invitation of the British National Committee from July 10-15, 1950. Over 40 member countries are expected to send delegates.

Floor Crack Stops Work.—The discovery of an extensive crack in the ferro-concrete floor of one of the main buildings at the Wallerscote works of the alkali division of I.C.I., Ltd., at Northwich, caused a temporary stoppage of work of the plant. Production of soda ash was held up for a time, but no serious interference with production was anticipated.

Distillery Fire.—The fire in the South Queensferry bonded warehouse of the Distillers Agency, Ltd., which caused damage of an estimated value of over £1 million, has made it necessary to transfer workers to other warehouses and plants of the group. Some 60 per cent of the 200 workers rendered idle are expected to be taken on immediately transport has been provided to take them to Glasgow, Leith or Markinch.

Pharmacy's £258,000 School.—The Pharmaceutical Society of Great Britain has authorised its council to sell to the University of London for £258,000 the new building going up in Brunswick Square, begun before the war to house the society's college, a school for the University of London, and its other activities. The school, now an independent institution, will occupy the building when completed and the question of the society's own headquarters is under consideration.

Effect of Coal Strike.—Britain's output of deep-mined coal last week was reduced 104,000 tons below the corresponding week of last year, due to the strike of Lancashire miners. Comparative figures are:—Last week: 4,065,000 tons (deep-mined 3,770,200 tons, opencast 295,300 tons). Previous week: 4,083,700 tons (deep-mined 3,794,200 tons, opencast 289,500 tons). The aggregate output during the first 19 weeks of the year was 79,394,400 tons, compared with 77,685,700 tons in the corresponding period last year.

Overseas News Items

Kaolin in Western Germany.—Deposits of kaolin of high purity are stated to have been discovered recently in the neighbourhood of Gelsenkirchen-Buer.

New Argentine Steel Group.—A company has recently been formed in the Argentine under the title Dalmine with the object of establishing a steel plant in Campana, Province of Buenos Aires.

New Ruhr Soda Works.—A new soda works, according to the Dutch daily *Economische Voorlichting*, has recently been opened in Gelsenkirchen-Bismarck. It is a subsidiary of the Duisburg Soda Works.

Austrian Iron and Steel.—Pig-iron output in Austria rose from 128,060 metric tons in the first quarter of last year to 200,644 in the corresponding period of this year. Crude steel output totalled 198,601 tons (143,231) tons and rolled products increased from 83,809 to 123,721 tons.

Danish Plastics Federation.—Denmark's manufacturers of plastic goods have recently decided to form an association, the Plastic Sammenslutningen, 15 Studiestraede, Copenhagen. There are at present some 150 manufacturers, mostly smaller establishments, employing about 1800 persons, with an annual turnover of some 75 million Danish crowns. Two factories supply the necessary basic materials.

Brazilian Fertiliser Projects.—Several factories for the manufacture of fertilisers are to be erected at commercially strategic points in Brazil, the first of which will be at Santos. Capital will be subscribed by the Brazilian chemical company Orquima, the French concern Possasse d'Alsace and the Nelson Rockefeller group. In the State of S. Paulo there are large tracts of exhausted land which could be reclaimed were it possible to obtain sufficient quantities of cheap fertilisers.

Hungary's Aluminium Industry.—Good progress is claimed in official quarters in Hungary in the manufacture of various aluminium goods, especially coach work for vehicles, furniture, and radiators for central heating. India and Pakistan are among the countries which have recently placed orders. Both the mining of bauxite (of which Hungary possesses ample resources) and the production of aluminium are in the hands of the Albart, the State enterprise. As the manufacturing sector has not apparently been able to cope with the growing output of bauxite, it has been decided to double the reduction capacity.

Oil in Leeward Islands.—Consultations are in an advanced stage concerning a project for under-water drilling for oil along the cost of the Leeward Islands, states the *Petroleum Press Service*.

Dutch Controls Ended.—A statement in the Dutch *Staatscourant* (the official gazette) for April 22, records that price control of laboratory equipment and medical instruments has been ended.

Plastics Factory for Chile.—A factory to be erected in Santiago de Chile for the manufacture of plastic materials will draw its equipment and machinery from the U.S.A. It will employ some 300 people and is expected to provide a margin for export.

Aluminium Pylons.—New means of making the most of the technical advantages of aluminium are being devised in Norway where output of the metal is increasing. The latest proposal is to use pylons of aluminium alloy to carry the electric cable. The pylons, which would be 25 metres high, weigh only one-third of their steel counterparts, and are believed not to cost appreciably more.

Campaign Against Tsetse Fly.—Two American scientists, Dr. Frederick J. Brady of the U.S. Public Health Service and Mr Harry H. Stage of the U.S. Department of Agriculture are leaving this month to make a survey of conditions affecting the control of trypanosomiasis and malaria in East and West Africa. Their visit is part of the scheme under the Economic Co-operation Administration for aid in the under-developed areas of the British Empire.

Sweden to Expand Shale Oil Output.—A specialist committee has proposed to the Minister of Trade that the Kvarntorp shale-oil works in central Sweden should be expanded. To carry out this scheme would involve an investment of about 21.4 million Swedish crowns, of which 15 million will be given in the form of a loan. At present, the works is expected to operate with an annual loss of about 2 million crown.

Tar Derivatives in the British Zone.—In the British zone of Germany, 698,285 tons of crude tar were produced last year. The following derivatives (in tons) were manufactured: pitch 375,848, tar-oil 205,958, crude naphthaline 10,500, pure naphthaline 5920, anthracene (40 per cent) 1558, phenol 2368, cresol and xylol 4862, pure pyridine 52 and pyridine and pyridine bases 263. Tar-oil and naphthaline were shipped abroad, chiefly to the United States.

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

RUBBER IMPROVEMENT, LTD., London, N.W. (M., 21/5/49.) March 28, debenture, to Barclays Bank Ltd., securing all moneys due or to become due to the bank; general charge. *—. September 1, 1947.

Satisfactions

BITUMINOUS COMPOSITIONS, LTD., Wakefield. (M.S., 21/5/49.) Satisfaction, April 8, of debentures registered March 6, 1937.

CABLES & PLASTICS, LTD., Leeds. (M.S., 21/5/49.) Satisfaction April 8, that property (45 Gledhow Lane, Leeds) comprised in first debenture and charge registered December 30, 1947, and a further charge registered November 19, 1948, has been released from charges.

IMPERIAL SMELTING CORPORATION, LTD., London, E.C. (M.S., 21/5/49.) Satisfaction April 5, of mortgage registered August 11, 1937.

NATIONAL SMELTING CO., LTD., London, W. (M.S., 21/5/49.) Satisfaction April 5, of mortgage registered August 11, 1937.

SOLARTON LABORATORY INSTRUMENTS, LTD., Kingston - on - Thames. (M.S., 21/5/49.) Satisfaction April 6, of debenture registered September 20, 1948, to the extent of £730 and unissued debentures cancelled.

WELLCOME FOUNDATION, LTD., London, N.W. (M.S., 21/5/49.) Satisfaction March 10, part of property (land forming part of Claremont Estate at Esher, with buildings thereon or on some part thereof) comprised in mortgage registered May 9, 1947, having been released from the charge; also satisfaction March 16, part of property comprised in mortgage and charge registered July 29, 1947; also satisfaction March 16, part of property comprised in mortgage and charge registered July 29, 1947, ceased to form part of the company's property or undertaking.

Company News

Dunlop Rubber Co., Ltd.—The operating profit of the whole Dunlop group for 1948 was £10,768,376 as against the adjusted figure of £9,116,933 for 1947. The Dunlop Rubber Co., Ltd., made a record profit of £4,967,980 as against £4,652,506 in 1947. £2,158,876 of this has been set aside for taxation. A dividend of 12 per cent with a bonus of 3 per cent (same), is recommended on ordinary stock.

New Companies Registered

J. F. Andrews & Co., Ltd. (468,199). Private company. Capital £4000. Manufacturing chemists, etc. Directors: G. Checkley, H. J. Seath. Reg. office: 3 Carlisle Buildings, Carlisle Road, Eastbourne.

Appleford, Ltd. (468,033). Private company. Capital £200. Manufacturing chemists, etc. Directors: S. P. Clements, L. J. Speight, J. H. G. Clements. Reg. office: 65 High Street, Sutton.

Blue Bow Products, Ltd. (27,026). Private company. Capital £2000. Manufacturers of medical and scientific articles, etc. Reg. office: 35 Rosehall Street, Glasgow, C.3.

Chambers' Castrique, Ltd. (467,948). Private company. Capital £2000. Manufacturing chemists, etc. Directors: J. F. Chambers, J. M. Cockeram. Reg office: 3 Church Crescent, Daybrook, Arnold, Nottingham.

Decel Engineers, Ltd. (468,274). Private company. Capital £10,000. Chemical engineers, welders, etc. Directors: N. Dawson, C. B. Watson, R. Richardson. Reg. office: Brilling, Co. Durham.

Chemical and Allied Stocks and Shares

CAUTION has continued to characterise activity in the stock markets, and small indefinite movements prevailed in most sections, despite the good impression created by the important financial results that have come to hand. The set-back shown by the Board of Trade April export figures, emphasising the growing competition in overseas markets, appears to have had a dominating influence on sentiment. Gilt-edged stocks firmed up, but later eased, awaiting terms of the next colonial loan. Initial dealings in the new Malayan loan were at a discount of ¼.

Shares of chemical and kindred com-

panies have been firm, and although small, movements on balance for the week showed a majority of movements in favour of holders. Imperial Chemical have been active around 47s. on further consideration of the full report and accounts. The annual meeting on May 31 is being awaited with particular interest in the City, as it is assumed that Lord McGowan, the chairman, will deal with proposals that have been made for nationalisation. Monsanto Chemicals came back to 55s., but were firmly held, and the issue of 600,000 additional 5s. shares is expected to meet with success. The company is among those showing marked expansion, and the new issue, which will bring in £1.5 million, will also enable special chemicals to be made here which otherwise have to be imported for U.S. dollars. The directors expect that future earnings will enable the 45 per cent dividend to be maintained on the larger capital. The new shares were offered at 52s. 6d., at which there is a yield of fully 4¼ per cent.

Elsewhere, Fisons have changed hands around 48s. 6d., Albright & Wilson 5s. shares were 30s., Bowman Chemicals 4s. shares 7s., Brotherton 10s. shares 21s., and Burt Boulton remained at 27s. 6d. Turner & Newall have been firm at 78s. 6d., British Oxygen were 98s. 1½d. awaiting terms of the company's pending big new issue. General Refractories held their rise to 25s., but elsewhere, Lever & Unilever at 47s. 4½d. lost a small part of their recent improvement.

The decision of Vickers to distribute a 100 per cent bonus drew renewed attention to shares of companies considered to have bonus prospects. Among these, Glaxo Laboratories were active around £22½.

The units of the Distillers Co eased to 27s. 6d., British Aluminium have been steady at 47s. 6d., and Borax Consolidated deferred firm at 53s. 6d. Staveley remained active around 90s. 6d., Tube Investments were £6¾, and Stewarts & Lloyds 56s. 3d., with Guest Keen at 49s. 3d., and Allied Ironfounders 65s. 3d. Babcock & Wilcox held their rise at 72s. 3d. awaiting the annual meeting. Swedish Match "B" shares improved to 28s. 9d. on the resumption of dividends with a payment of 5 per cent—their first since 1931.

Boots Drug have been firm at 55s. on expectations of good financial results. British Drug Houses 5s. shares changed hands around 7s. 6d., and Timothy Whites at 36s. British Glue 4s. shares continued in favour and rose sharply to 19s. 6d. British Xylonite (down to 77s. 6d.) remained under the influence of the annual results and chairman's statement that big capital expenditure has not yet ended. British Industrial Plastics 2s. shares were 5s. 3d., De La Rue 35s., and Kleeemann 14s. Oils showed small irregular movements with Anglo-Iranian £8¼, and Shell 66s. 3d. awaiting the financial results, and the outcome of Anglo-Iranian's negotiations with the Persian Government. Amber Chemical 2s. shares have changed hands around 6s. 9d., British Chemical and Biologicals 4 per cent preference were 20s. 9d., and L. B. Holliday 4½ per cent preference 22s. 7½d.

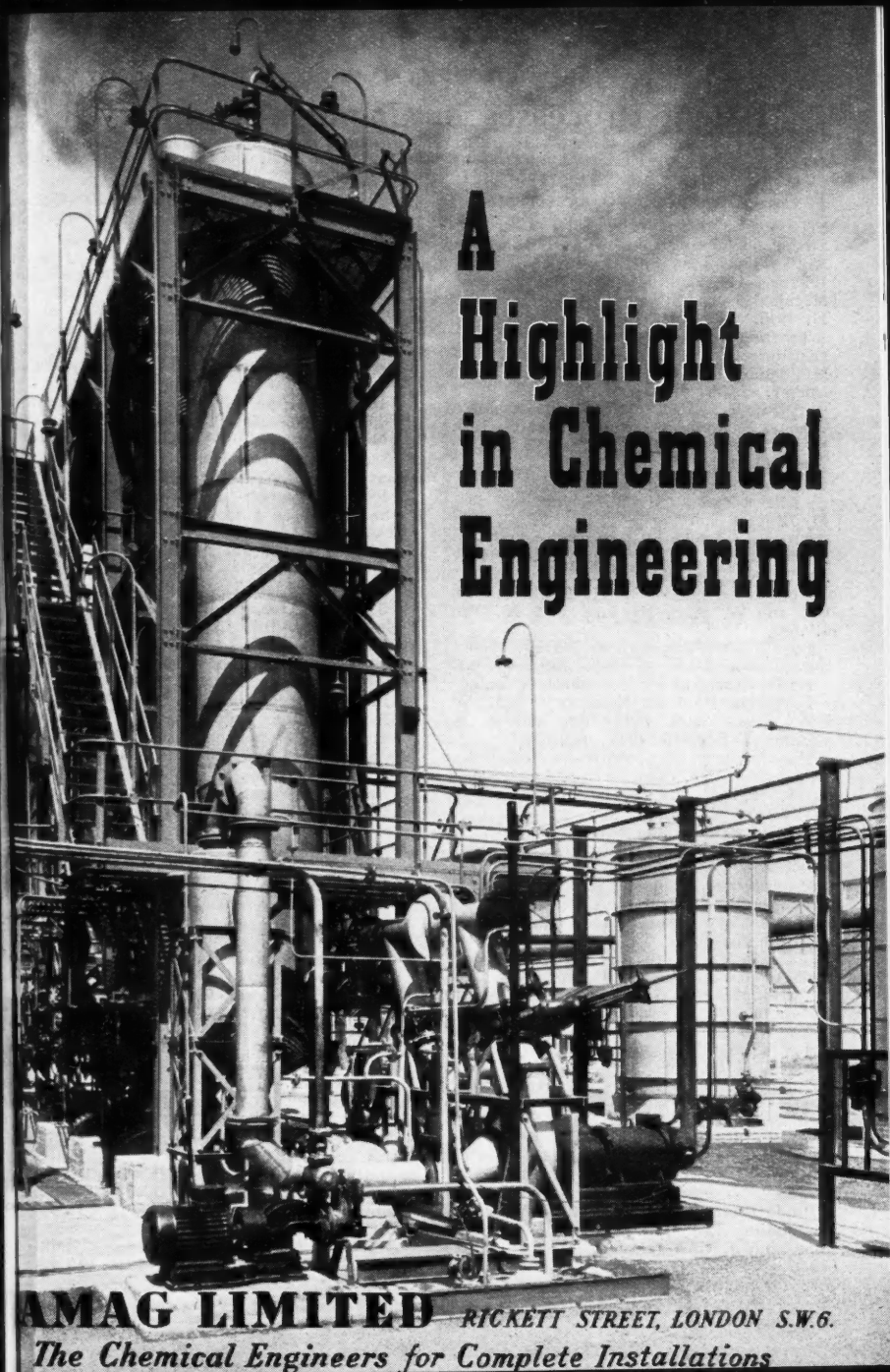
British Chemical Prices

Market Reports

BUSINESS on the industrial chemicals market during the past week has been more or less of a routine nature and in most sections the supply position has been well able to meet the steady flow of buying orders. The demand for shipment has been well maintained at a satisfactory level and a fair volume of inquiry for early shipment remains in circulation. With few exceptions, prices are reported to be well held and the undertone generally firm. Further reductions in the red and white lead quotations have been notified, due to the decrease in the controlled price of pig lead. The basic price for dry red lead is now quoted at £111 per ton and for white lead at £121 per ton. The coal-tar products market is without feature and a quiet trade has been passing for most products. The overseas demand for pitch and creosote oil has been of moderate dimensions.

MANCHESTER.—Prices of certain chemical products on the Manchester market have been affected by this week's Ministry of Supply reductions in quotations for copper, lead and zinc, otherwise values of chemicals have shown little movement during the past week. Actual new business in the alkali and other leading products has been of fair extent on home-trade account, with industrial users in the textile and allied trades calling for steady deliveries, and other consumers generally providing good outlets for a wide range of materials. The demand for the tar products remains somewhat patchy; light distillates, however, are meeting a fairly active inquiry.

GLASGOW.—There have been no noteworthy changes either in the supply or demand positions in the Scottish chemical market during the past week. Prices have continued to show a slight decline. Supplies for all types of chemicals have been fairly well absorbed, particularly coal tar derivatives. The export market has been quiet, although considerable business is being negotiated.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Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Embossing of thermoplastic materials.—British Thomson-Houston Co., Ltd., and R. Keitley. Dec. 9, 1946. 619,421.

Process for drilling glass-bonded mica.—Mycalex Corporation of America. Dec. 11, 1945. 619,425.

Treatment of streptomycin solutions.—Distillers Co., Ltd., P. D. Coppock, J. T. McCombie, L. Mulligan, and A. G. White. Dec. 11, 1946. 619,566.

Apparatus for delivering measured volumes of liquid.—Improved Designs, Ltd., N. K. Read, and H. L. Read. Dec. 12, 1946. 619,464.

Manufacture of polyamides.—I.C.I., Ltd., E. Ellery, and R. J. W. Reynolds. Dec. 13, 1946. 619,576.

Process for making 1 : 4-dicyanobutene.—I.C.I., Ltd., H. P. W. Hugill, and R. G. A. New. Dec. 13, 1946. 619,577.

Heat exchangers.—The Gas Light & Coke Co., and W. B. S. Newling. Dec. 13, 1946. 619,585.

Pest control preparations.—Ashe Laboratories, Ltd. Dec. 13, 1946. 619,705.

Manufacture of cyclo-aliphatic diamines.—E. I. Du Pont de Nemours & Co., W. Kirk, Jun., R. S. Schreiber, and G. M. Whitman. Dec. 16, 1946. 619,706.

Manufacture of polyamides of nylon type.—E. I. Du Pont de Nemours & Co., E. K. Bolton, and W. Kirk, Jun. Dec. 16, 1946. 619,707.

Polymerisation of chloroprene.—E. I. Du Pont de Nemours & Co. Dec. 15, 1945. 619,620.

Manufacture of plastic materials exhibiting a colour-graduation effect.—Soc. des Usines Chimiques Rhone-Poulenc. Feb. 26, 1946. 619,623.

Stabilisation of furan.—E. I. Du Pont de Nemours & Co., and O. W. Cass. Dec. 18, 1946. 619,645.

Manufacture of organic compounds containing antimony.—Wellcome Foundation, Ltd. T. M. Sharp, and W. H. Gray. Dec. 19, 1946. 619,658.

Processes for preparing substituted amidines.—Wellcome Foundation, Ltd. (Burroughs Wellcome & Co. (U.S.A.), Inc.) Dec. 19, 1946. 619,659.

Process for heating and cleaning sealed containers.—I.C.I., Ltd. Dec. 21, 1945. 619,723.

Production of an antibiotic.—Wellcome Foundation, Ltd., G. C. Ainsworth, C. G. Pope, and J. C. Macsween. Dec. 21, 1946. 619,572.

Apparatus for heating materials.—Dunford & Elliott (Sheffield), Ltd., and C. W. Heathcote. Dec. 24, 1946. 619,745.

Distillation of coal tar or mineral oils.—Newton, Chambers & Co., Ltd., and H. C. Mann. Sept. 10, 1945. 619,574.

Manufacture of flux-coated welding electrodes and alloy compositions suitable for use therein.—Murex Welding Processes, Ltd., and E. C. Rollason. Nov. 8, 1945. 619,763.

Distillation processes.—I.C.I., Ltd., and O. G. Dixon. Nov. 13, 1945. 620,129.

Method for the production of pure anhydrous carragheen jelly.—R. H. Westergaard. Nov. 27, 1945. 619,953.

Production of di-(*p*-chlorophenyl),trichlorethane.—Merck & Co., Inc. Feb. 22, 1945. 620,134.

Method and means for the thermal treatment of light alloys.—T. Bostroem. Feb. 28, 1945. 620,138.

Apparatus for producing glass fibres.—Glass Fibers, Inc. Nov. 15, 1945. 619,769.

Manufacture and application of urea derivatives.—Ciba, Ltd. April 18, 1945. 620,142.

Process for the manufacture of aqueous dispersions of polymers of substances capable of polymerisation.—N.V. De Bataafsche Petroleum Maatschappij. July 20, 1945. 619,870.

Apparatus for the hydrogenation of fatty acids and/or their glycerides.—De Nordiske Fabriker, De-No-Fa, A/S, and C. F. Holmboe. April 30, 1945. 620,043.

Apparatus and method for hardening fatty acids and/or their glycerides.—De Nordiske Fabriker, De-No-Fa., A/S., and C. F. Holmboe. April 30, 1945. 620,145.

Method of hardening fatty acids and/or their glycerides and apparatus for carrying out the methods.—De Nordiske Fabriker, De-No-Fa, A/S., and C. F. Holmboe. April 30, 1945. 619,961.

Conversion of hydrocarbons.—Socony-Vacuum Oil Co., Inc. June 9, 1945. 620,146.

Apparatus for electric arc welding.—English Electric Co., Ltd., and K. F. Barlow. May 17, 1946. 619,962.

Recovery of xylidines.—Anglo-Iranian Oil Co., Ltd., S. F. Birch, F. A. Fidler, and R. A. Dean. May 24, 1946. 619,873.

Manufacture of synthetic resinous compositions.—Crane Packing Co. June 22, 1945. 620,153.

Machines for working glass tubes under heat.—G. S. Shaw. May 29, 1946. 619,965.

Production of aromatic amines.—S. F. Birch, F. A. Fidler, D. V. N. Hardy, and E. L. Molloy. June 13, 1946. 619,877.

Treatment of pitches or tars and the manufacture of moulded articles therefrom.—C.D. Patents, Ltd., C. D. Greaves, and D. B. Smith. June 19, 1946. 619,967.

Colour filters.—E. J. Ambrose, D. J. Pacey, and J. G. Salmon. June 20, 1946. 620,054.

Process for improving the fastness of dyeings and prints produced with water-soluble dyestuffs.—Ciba, Ltd. June 29, 1945. 619,969.

Manufacture of optical glass.—Corning Glass Works. Nov. 9, 1945. 619,971.

Apparatus for filtration of liquids.—Paterson Engineering Co., Ltd., and E. W. Baily. July 9, 1946. 619,973.

Dehydration of tetrahydropyran.—I.C.I., Ltd., J. G. M. Bremner, D. G. Jones,, and R. R. Coats. Aug. 14, 1946. 619,976.

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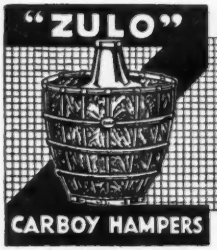

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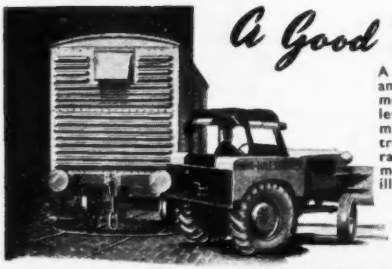

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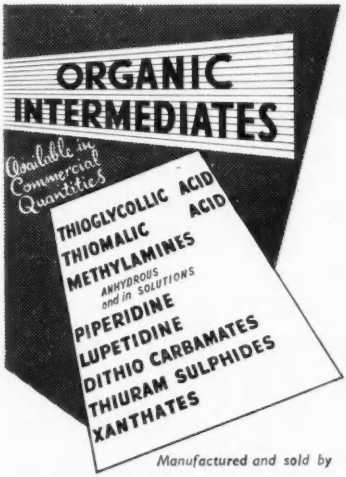

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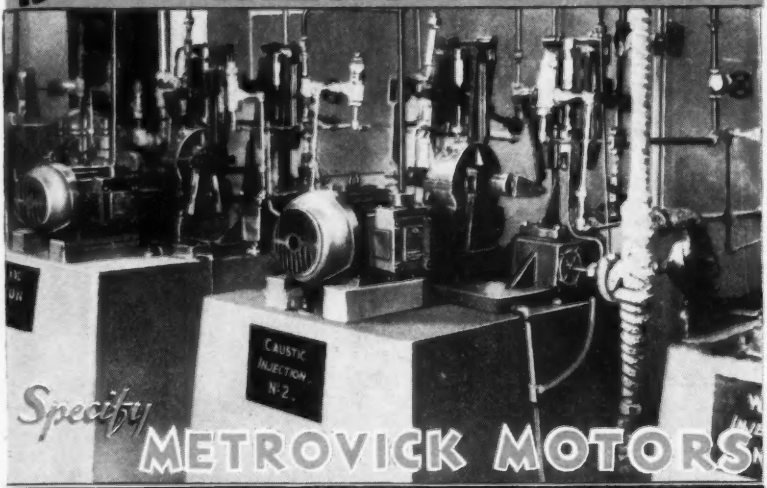

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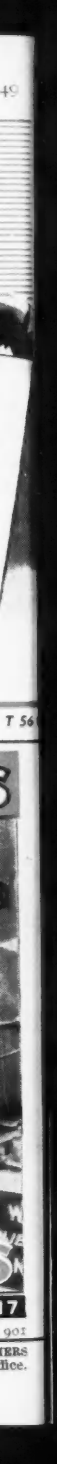
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